The Evaluation of a Tertiary-level Distance-mode Aural Training Programme

Phillip John Gearing

M.Mus, B.Mus, LTCL, ARCO

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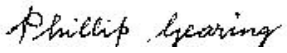
Declaration

The work presented in this thesis is, to the best of my knowledge and belief, original and my own work, except as acknowledged in the text. The material has not been submitted, either in whole or in part, for any other degree at this or any other university.



Phillip Gearing

Acknowledgements

"No man is an island": thus wrote John Donne (1572-1631) in his *Meditation XVII*. Although used in a different context from the intent of the poet, the quotation nevertheless is a reminder of the interconnectedness of human life and society; although my name appears on the title page of this work, it nevertheless has not been possible to achieve without the contribution, whether great or small, of other people whom I take this opportunity gratefully to acknowledge.

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Publications and Presentations by the Candidate Relevant to the Thesis

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Gearing, P. (2006, September). *The Evaluation of a Tertiary-level Distance-mode Aural Training Programme: A Progress Report*. Paper presented to the Faculty of Arts Research Forum, University of Southern Queensland, Toowoomba.

Fogarty, G., Buttsworth, L., and Gearing, P. (1996). Assessing Intonation Skills in a Tertiary Music Training Programme. *Psychology of Music, 24*, 157-170.

Abstract

The purpose of the study was to determine whether a prototype aural training programme could successfully develop tertiary level aural training skills if face-to-face teaching components were replaced entirely by interactive CD-ROM delivery.

Audiation is the ability by which one hears with the eyes (and, by extension, sees with the ears), and the reciprocal nature of listening and reading has long been recognised (Karpinski, 2000). According to Allvin (1970), sound-to-sight and sight-to-sound skills can be developed through CAI with an effectiveness equal to face-to-face instruction. It appears that some aural skills assist naturally in the development of other aural skills; Carlsen (1969), for example, suggested that the effect of aural training by instruction generalised to sightsinging ability, while Baggaley (1974) writes in contrast that the ability to discriminate does not necessarily guarantee the ability to recognise and identify. Porter (1977) asserts what is now a generally known fact that one must *teach* for transfer, rather than to expect transfer to be automatic.

A six-semester distance-mode prototype aural training programme was developed at the University of Southern Queensland and delivered to tertiary music students in all states of Australia as well as other countries including New Zealand, Singapore, south-east Asia and the United Kingdom.

A pre-test/post-test model assessing three groups (internal, external and control) was applied at the beginning and end of the first semester of the six semester programme. The internal group received face-to-face teaching during the first semester; the external group received tuition via CD-ROM; the control group received no tuition in ear training.

The study sought to compare results within and between the three groups in the areas of rhythmic perception, melodic perception, scale/mode recognition and interval recognition during this first semester of the study, and to find correlations between demographic data and test performance. External students achieved higher levels of improvement for all aural acuities than internal students and control group students. The findings indicate that students learning multiple instruments and students learning piano perform aural tasks better than students learning only a

melody line instrument (including voice) or no instrument. In addition, internal students' results showed a greater ceiling effect than the externals', suggesting that the aural perception curriculum itself may need to take into account different individual levels of achievement. Tertiary music schools experiencing funding constraints may be able to re-organise aural tuition practice either to replace or to augment face-to-face classes with external aural training materials, without sacrificing the quality of their instruction.

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Abbreviations

ABRSM	Associated Board of the Royal Schools of Music
AMEB	Australian Music Examinations Board
BOSSS	Board of Secondary School Studies
CAI	Computer-assisted instruction
DEC	Distance Education Centre (now abbreviated as DeC)
EXT	external
HECS	Higher Education Contribution Scheme
IELTS	International English Language Testing System
NACTMUS	National Australian Council of Tertiary Heads of Music
NCODE	National Council for Open and Distance Education
ONC	on-campus
QSA	Queensland Studies Authority
QTAC	Queensland Tertiary Admissions Centre
URL	Universal Resource Locator
USQ	University of Southern Queensland

Chapter 1
Introduction

1.1 Preamble

Modern communication systems and the globalisation of knowledge have opened the way for Australia to become both an importer and exporter of education. Although Australian universities are offering increasing numbers of courses to overseas students on a fee paying basis, our country has also been seen as a lucrative market for overseas providers such as the Open University of the UK.

It has become clear, given the changing nature of the student population, that the traditional methods of lock-step instruction occurring during limited periods of the year and at set times during the day are geared more to the needs of institutions rather than their clients. Professional and domestic commitments and the rising individual costs of university education are making it increasingly difficult for students to present themselves regularly at the source of instruction; it is for these reasons, as well as for reasons of convenience, that distance learning is expected to become increasingly popular (Stephens, 2003). Without the flexibility provided by distance education, access to higher education would be denied to a capable and needy section of the population.

Many studies, technical reports and dissertations have been completed over the last seven decades which have been aimed at determining if any measurable or statistically significant differences exist between technologically mediated and "traditional" classroom learning (Ramage, 2002). Potashnik and Capper (1998), quoting earlier research by Capper (1993), state that in some cases those who use computer-based distance packages learned both faster and at substantially lower cost than the latter (Capper, 1990). Overwhelmingly, the studies cite either no difference between the groups, or up to 5% increase in the technologically mediated group over the classroom group (Smeaton & Keogh, 1999; Wade, 1999; Lin & Davidson, 1994; Sener & Stover, 2000; Navarro & Shoemaker, 1999; Schulman & Sims, 1999), and teaching staff supported online courses as being as effective as classroom courses (Dobrin, 1999). Furthermore, it is interesting to observe that no studies were found that exposed lower test scores of online students compared to traditional students (Smeaton & Keogh, Wade, Lin & Davidson, Sener & Stover, Navarro & Shoemaker, Schulman & Sims).

Richard Clark believes, and has convinced many other researchers to a similar belief, that many if not all of these studies were flawed in some way, because they attributed the

outcomes of the two different learning groups to the media rather than to the learning method promoted by the media used (Clark, 1994). In addition, many of these studies focussed on results at the end of the course (Clark, 1983) rather than measuring discrete skills and acuities associated with the learning. Four key shortcomings of the research have been noted (Phipps & Merisotis, 1999): (i) lack of control over extraneous variables, (ii) lack of randomness in subject selection, (iii) the validity and reliability of the instruments, and (iv) underweighting the importance of staff and student perceptions.

Researchers have looked at distance education from many perspectives, excluding and including various technologies from definitions, in order to make a definitive pronouncement in response to the question: Does technology impact (i.e., have an effect, either positive or negative) on learning? Ramage (2002) found no evidence of any kind that categorically proves technology does *not* impact on learning in some way, either positive or negative.

It has been noted (Diaz & Cartnal, 1999) that the choice of enrolment as an on-campus or external student is directed not only by extra-cognitive considerations such as geographical location, cost, convenience and flexibility and so forth, but also by preferred cognitive learning styles. Those who choose to enrol externally tend to be independent learners and prefer conceptual learning styles whereas those who prefer the on-campus mode tend to prefer social and applied learning styles.

Opposed to the views of Clark expressed above, Cobb (1997) contends that media selection does have a relationship to learning outcomes. Kozma (1994) agrees that choices made regarding technology selection are as important as the instructional methods themselves, and advises further research to determine which technologies are best suited to complement the best methods. Potashnik & Capper (1998) warn that care must be exercised to avoid allowing the novelty of technology to drive decisions regarding the most appropriate delivery mode for distance education programs, overshadowing the more important decisions regarding curriculum and instructional quality. They express the opinion that if a country's conventional education or teacher training program is not effective, using a new technology to deliver that education or training will not improve its efficacy.

McLain (2003) writes that a single descriptive study by Fallin (1992) reported that music educators in U.S. public schools perceived distance education as useful for in-service training (67%), with television broadcasts receiving the most interest. According to McLain, 38 of the U.S. states have tertiary music programmes offering internet music courses, yet she found no research concerning the status or effectiveness of U.S. college music and distance

education using that medium. The 155 music courses she found constituted approximately 3% only of the 52,270 online courses available nationwide. She believes this may be unsurprising because of the aural nature of music learning and teaching and the inconsistency of computer sound technology at the time. She noted a further factor could be the extensive amount of time necessary to develop and implement online courses, and that the results seem to indicate a reluctance to accept distance learning as a viable option by many U.S. music faculties. McLain cautioned, however, drawing on work by Moore (1990) and Verduin & Clark (1991) that distance education can be as effective as traditional instruction only when there is student-to-student interaction, and timely teacher-to-student feedback as well as using the method and technologies appropriate to the instructional tasks.

Since McLain wrote in 2003, there has been a rise in interest in the United States to address this area. By way of example, *Technological Directions in Music Education* conferences[1] were held annually from 1994 to 2003, sponsored by The Institute for Music Research at the University of Texas, San Antonio. The second of these was held in January 1995 and featured several foci, of which aural skills was one. The four papers associated with this focus were

- A Model for the Effective Use of Computer-based Instruction for Ear Training (George J. Hess, Jr., School of Music Alabama State University);
- An Integrated Computer Curriculum for Music Ear Training (Paul Dworak, University of North Texas College of Music);
- CASPAR: Aural Skills Software for the Refinement of Dictation Strategies (Carlos Maldonado and Brett Terry, University of Illinois);
- The Usefulness of a Curriculum-based Tutorial and Testing Program in the Acquisition of Theory Skills at the College Level (John B. Post, University of North Colorado).

Taylor (2000) notes that distance education operations have evolved through four generations, and that a fifth generation is currently evolving: (i) the correspondence model based on print technology, (ii) the multi-media model based on print, audio and video technologies, (iii) the telelearning model based on telecommunications technologies, (iv) the flexible learning model based on online delivery via the internet, and (v) the intelligent flexible learning model capitalizing on the features of the internet and the web.

[1] Conference proceedings can be accessed at the URL http://music.utsa.edu/tdml/.

The 1997 submission of the National Council of Open and Distance Learning (NCODE) for the Review of Higher Education Financing and Policy identifies Australia as a world leader in the area of distance education, with "a long history of equitable provision that has maintained parity of esteem of qualifications, by using curricula and assessment procedures identical or closely comparable to those offered conventionally taught students, who share the expertise of the same academic staff" (NCODE submission, p. 1). The report also anticipated that many future demands on universities will not be able to be met through traditional means, and that a technologically supported move toward more flexible learning systems is inevitable, especially for postgraduate coursework, designed to enable people to further or to change their career plans. The report did not rule out campus-based education, however, recommending that it will and should continue; but it expressed the opinion that the methodologies of campus-based education increasingly will be shaped by developments already found successful in distance learning modes (NCODE submission, p. 2).

1. 2 Rationale for the Study

The University of Southern Queensland (USQ) in Toowoomba, Australia is internationally recognised as one of the world's leading providers of distance education, a field in which it has been active since the 1970s. It was not until the 1990s, however, that music was first offered by distance, incrementally phased in between 1997 and 2000. At the time of writing, the university has graduated around 200 music teachers who have completed their entire academic programme as external students. The graduates come from all Australian States, and from New Zealand and Singapore.

The initial programmes were related principally to instrumental and vocal teaching. They were developed because it was recognised that there were many studio music teachers in both city and regional areas who, for a variety of reasons, were unable to access study programs that would help them to obtain, or to upgrade, teaching qualifications. Specific areas covered through these teaching programmes offered only in external mode are

- Music instrumental and vocal teaching pedagogy (piano, violin, viola, cello and singing);
- Music writing techniques (Module A of the Music Craft courses);
- Aural development (Module B of the Music Craft courses);
- Music history.

The main programmes offered are the Certificate in Music Teaching (offering the courses *Music Craft 1* and *2*), the Diploma in Music Teaching (offering *Music Craft 3* and *4*), the Associate Degree in Music (offering *Music Craft 1-4*) and the Bachelor of Music (offering *Music Craft 1-6*). The largest enrolments are in *Music Craft 1* and *Music Craft 2*.

With the introduction of aural development in the external offerings, the University specified that the internal (ONC) and external (EXT) modes should have an equitable outcome for students. The major reason for this was that the external offering did not include the practical elements (in particular, sightsinging) that are a feature of the classes for internal students and which are regarded as highly important in contributing to the development of aural acuities. If the external students did not have such activities as part of their tuition, their development could reasonably be expected to be different from that of the internal students. The methods of internal and external instruction are detailed in chapter 3.

It was recognised immediately that, by and large, the internal students, generally 17-20 years of age, had more up-to-date musical background, more recent study experience, and youthful energy to contribute to their studies; but that the external students, generally aged between 30 and 60 years old, possessed maturity and a developed sense of commitment in their favour. Anecdotal evidence consistently suggested that these almost dichotomous factors resulted in largely similar study outcomes overall. This was supported in a general way in a paper written by the researcher and Associate Professor Laurence Lepherd, also of USQ, and presented at the 2001 NACTMUS Conference.[2] The paper contained tabulated information (see Table 1.1) which showed a relatively comparable performance for both internal and external students. The percentage cut-off marks for each possible grade are given along with the percentage of the student cohort achieving each grade, for both internal and external enrolments. The results in the table pertain to *Music Craft 1* in semester 1, 1999, *Music Craft 2* in semester 2, 1999, and *Music Craft 1* in semester 1, 2000.

Nevertheless, the need was felt to ascertain whether the anecdotal evidence could be supported by more solid data. The unique situation at USQ allowed for an interesting research project that had genuine practical potential.

[2] Lepherd, L. & Gearing, P. (2001, July). *Musical development at a distance*. Paper presented at the conference of the National Australian Council of Tertiary Heads of Music, Byron Bay, Australia.

Table 1.1

Results in Music Craft courses (three semesters) 1999-2000: Internal and external modes.

Internal (n = 66)		**External (n = 76)**	
Grades	% of students	Grades	% of students
HD (90-100%)	10.6	HD (90-100%)	11.8
A (80-89.9%)	36.4	A (80-89.9%)	31.2
B (65-79.9%)	24.2	B (65-79.9%)	28.9
C (50-64.9%)	18.2	C (50-64.9%)	21.1
F (< 50%)	10.6	F (< 50%)	6.2

1.3 The Research Questions

The primary research questions that consequently arose, and which are the focus of this study, are

(a) Do internally enrolled and externally enrolled Music Craft students show a similar rate of overall development in aural work?

(b) Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in rhythmic work?

(c) Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in melodic work?

(d) Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in scale/mode recognition?

(e) Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in interval recognition?

Secondary questions of interest to the researcher are

(a) Is there any correlation between actual achievement and students' self-rating of each aural skill measured?

(b) Is there any correlation between actual achievement and students' self-rating for singing in tune and for holding a vocal part?

(c) Is there any correlation between subjects' measured achievement and demographic considerations?

1.4 Scope of the Study

The problems posed by the research questions were investigated during enrolment in *Music Craft 1* using a pre-test/post-test model, with subjects divided into three groups – the internal enrolments, the external enrolments, and a control group of students from Expressive Arts within the USQ Faculty of Education.

Chapter 2 is the literature review. In this chapter, rather than taking aural perception as a broad topic, literature relating to different areas of aural acuity (rhythm, pitch, etc.) as it relates to the present study is examined in turn.

Chapter 3 describes the development of the materials used in the six Music Craft courses at USQ, with particular emphasis concentrated on *Music Craft 1*, this course forming the "treatment" in the research study. The other five Music Craft courses are briefly described in order to place *Music Craft 1* in an overall context.

Chapter 4 outlines the research methodology and the conduct of the research. The results of the study are described in chapter 5; the discussion is presented in chapter 6, along with conclusions and recommendations.

The Appendixes provide relevant documents and materials such as memoranda, the survey and the test used in the conduct of the research.

1.5 Boundaries of the study

The study was confined to students in their first year of study at USQ. Students assigned to the control group were enrolled in the Bachelor of Education administered by the Faculty of Education; the other participants in the study were enrolled in the course *Music Craft 1* and were enrolled in one of the following programmes, administered with the exception of the combined degree programme, by the Faculty of Arts:

- Certificate in Music Teaching;[3]
- Associate Degree in Music;
- Bachelor of Music;
- Bachelor of Music/Bachelor of Education (combined degree programme, administered by the Faculty of Education);
- Bachelor of Arts.

[3] There were no enrolments from the Diploma in Music Teaching: the Certificate in Music Teaching articulates into the Diploma, and any students who ultimately completed the Diploma enrolled initially in the Certificate programme.

It is noted that the study is confined to the areas of rhythmic and melodic acuity, and the recognition of scales, modes and melodic intervals on account of the pre-existent structure of the *Music Craft 1* curriculum.

1.6 Definitions

The following terms are to be found throughout the thesis:

- course — an individual subject
- external student — a student enrolled in a course which provides material for study without using face-to-face classes on the University campus
- internal student — a student enrolled in a course which holds face-to-face classes on the University campus
- on-campus student — (see internal student)
- programme — a certificate, diploma or degree, comprised of a number of courses

Chapter 2

Literature Review

2.1 Rationale

Given the pre-existent nature of the course *Music Craft 1*, it seems logical to arrange the literature review under headings that relate in some measure to the course curriculum. The literature will be considered, therefore, with respect to the discrete areas of

- aural perception in general;
- rhythm and metre;
- pitch;
- interval recognition;
- computer-assisted instruction (CAI).

The nature of musical activity and perception, however, means that some overlap is inevitable, and so the distinctions between the designated areas of aural ability may not always be entirely clearcut.

2.2 Aural Perception: General Considerations

Audiation and sightsinging are two pivotal skills which ear training programmes seek to develop. *Audiation* is a term coined by Edwin Gordon meaning "to hear and comprehend music for which the sound is no longer or may never have been physically present".[4] Bruce Benward uses the terms *the seeing ear* ("the ability to hear music and determine the nature of the musical devices, the melody, the harmony and the rhythm") and *the hearing eye* ("the ability to look at music and determine from sight alone how it will sound"),[5] which are known in Australia as the titles of two books by Rupert Thackray – *The Seeing Ear* (1982) and *The Hearing Eye* (1984). The reciprocal nature of listening and reading has been long been recognised (see the Introduction in Karpinski, 2000). It is a process which we readily understand in relation to our everyday language: it is what takes place, for example, when one silently reads a newspaper or book with one's eyes, but "hears" in one's mind the words which are seen. The

[4] Gordon, E. (1993). *Learning sequences in music: Skill, content, and patterns*. Chicago: GIA Publications, p. 13.

[5] e.g., Benward, B. (1988). *Basic sightsinging and ear training: Strategies and applications*. Wm. C. Brown: Dubuque, p. ix.

general purpose of much training in aural perception is to develop the ability to hear in one's mind the music one sees notated on the page, or to be able to write down the music which is heard either aloud in performance (transcription) or in the privacy of one's mind (composition). In order to be successful in the equivalent musical process, one must become skilled in the perception and discrimination of rhythm, pitch, melody, harmony, texture, timbre and a multitude of other related concepts.

As with the learning of a foreign language, it is important to be able to recognise patterns of symbols (letters in languages, notes in music) both visually and aurally, and sometimes also to recognise a different alphabet (e.g., Greek, Russian, Hebrew, and to a lesser extent, German, Danish, etc.). Involved with the recognition process, if one is to respond in the target language, are the abilities to discriminate, to identify and to memorise. Development of these same skills is important in the successful promotion of audiation; however, the musical "language" – Sloboda (1985) utilises the three components of phonology, syntax and semantics, and Aiello (1994) reports a number of links between language and music – in some respects has more complex layers of learning to be achieved than a spoken language, and many of the layers are interwoven.

A glance through the list of references (see page 192) will indicate that from the latter half of the twentieth century, many studies have investigated various facets of aural perception and its teaching, so that it is possible to build a general picture of how the human mind perceives music, and how best to develop that perceptive skill. Some of it would appear to be common sense, perhaps in combination with anecdotal experience; but to have such methods confirmed as effective, or to show new and potent possibilities, is useful knowledge.

To what end is aural training given and received? Several responses are possible, but these could likely be summed up with the single response: to equip a musician (whether amateur or professional) for work. What does such work entail? Performing, either solo or in large or small ensembles (each of which requires different listening skills), composing, transcribing (e.g., for ethnomusicological field research), conducting, studio teaching, classroom teaching, etc. Thus, aural training is not – or should not be – an end in itself, but a means to an end.

Radocy (1975) suggests that lack of confidence in one's own ability may be a primary reason for erroneous response, rather than inability or misunderstanding. Certainly, the present author's own teaching experience at both the secondary and tertiary levels has been that students usually can perform beyond their initial expectation. Perhaps this is because

music training, as reported in Sloboda (1985), builds on skills already acquired through enculturation; it is the conviction of the present author that the student's latent knowledge needs firstly to be awakened and understood. The aural class is an environment in which students often feel that their potential inabilities are openly exposed; it is important, therefore, as in any learning environment, to teach for success, that is, to structure the curriculum and to sequence the learning experiences in such a way as to lead the student from what is known to what is unknown in manageable steps. Geake (1999) found that successive synthesis was a preferred mode of informational encoding. Sergeant and Boyle (1980), although specifically investigating contextual influences on pitch judgement, concluded that discrimination was more successful in one-step tasks rather than two-step tasks.

This is where music education research makes an important contribution. The findings of music education and music psychology research projects assist music educators to know and to understand learning processes, so that the way in which such processes are developed can constantly be improved.

For example, Geringer and Madsen (1996) confirmed and extended the findings of an earlier study (Madsen and Geringer, 1990) by showing that the listening patterns of musicians and nonmusicians are different. They found that, when listening to salient examples of rhythm, dynamics, timbre and melody in instrumental music, musicians tended to note timbre whereas nonmusicians focussed on dynamics and melody. On another front, Baggaley (1974) confirms that piano tone is generally easier to identify than other instrumental timbres. This is helpful information, in that music classrooms and lecture rooms are generally equipped with at least this one instrument; but it has also been suggested that university ear-training courses should take steps to *transfer* knowledge from a piano focus toward more heterogeneous tone qualities (Byo, 1993).

Seashore (1938) defines pitch discrimination as "the ability to hear small differences in pitch". The ability to discriminate does not necessarily guarantee the ability to recognise and identify (Baggaley, 1974), although pitch naming and pitch discrimination may appear related if the discrimination task is sufficiently difficult. Hargreaves (1986) reports that several studies have found that poor singers tend to obtain low scores on pitch discrimination tests. The belief that pitch discrimination can be improved by training (Seashore, 1938) may also be an important factor in the development of singing ability.

Bergan (1966) found that a positive correlation existed between pitch judgement and imagery. He also found that a positive correlation is observed between pitch judgement and

musical memory. Long (1977) reported that music training increases memory for pitch, and that memory is dependent on learned systems. Long also found that M-shaped tonal melodies were easier to remember than V-shaped melodies, conjecturing that an M-shaped melody may require more attention to interval size. Thackray (1973), when reporting on the investigation of a test of harmonic perception, found that the later the "changed" chord occurs in the progression, the more easily it is observed. This may be explained by serial curve theory. Researchers (e.g., Murdock 1962) have found that subjects remember items placed at the beginning and end of lists more readily than items in the middle of lists, forming a serial curve of memory which favours both primacy (first) and recency (most recent).

Butler (1997) notes a general lack of focus in defining educational objectives in aural training. He observes that aural training and musical performance are widely viewed as inseparable, and that there has been a perceptible shift toward materials that are "musically realistic" and "context rich". At Huddersfield Polytechnic in the UK, for example, the course developed aims to develop skills relative to the needs of the everyday performing musician, with an emphasis on student-initiated activity (Cargill and Pratt, 1991), by broadening and deepening understanding of the term *aural* (Pratt and Henson, 1987). Work is carried out by informal lecturing, discussion and practical activity, supplemented by do-it-yourself assignments (Pratt and Henson). Transcription skills are self-paced by the students individually, out of class time; and assessment items measure application of knowledge rather than accuracy of response, based on effort and the level of observation along with clarity of argument (Cargill and Pratt).

As a means toward developing audiation skills, many, if not most, aural training courses teach sightsinging. Results of Carlsen's study (1969) suggested that the effect of aural training by programmed instruction generalised to sightsinging ability, although Aaron (1990, reviewed by Ritcher, 1994) suggests, in a study on the effects of vocal coordination instruction on, *inter alia*, pitch accuracy and pitch discrimination, that instruction in aural discrimination has relatively little effect on singing accuracy. In addition, a study by Porter (1977) asserts what is now a generally known fact that one must *teach* for transfer, rather than to expect transfer to be automatic.

Given that many musicians and music educators are frequently involved in conducting ensemble activities, another part of the audiation process is to detect errors. Stwolinski, Falconer and Schwarzkopf (1988) reported that listening was a better short term method for preparation to recognise performance mistakes than was sightreading. Byo

(1993), reporting on a study which tested the influence of textural and timbral factors on the ability of music majors to detect performance errors, expressed the opinion that error-detection skills may provide a link between basic ear training and the aural skills necessary for conducting a live music rehearsal, although research showed conflicting results as to whether the physical act of conducting interferes with the ability to detect performance errors.

In a later study (Byo, 1997) it was found that achievement in music theory, sightsinging, instrumental instruction and ensemble experience was not significantly related to skill in error detection; however, experience with choral education and arranging were indicators of success in pitch error detection, pointing to a need for context-specific strategies in developing error detection skills.

Choral experiences, no matter how extended, have long been considered valuable in the development and synthesis of aural acuities. Melodic singing should not be confined to single-line works, as sightsinging material frequently tends to be. The findings of a study on the effect of a simultaneous melodic stimulus on harmony intonation of college singers (Small, 1982) indicated that singers performed slightly, though significantly, better in tune when singing with the in-tune melody stimulus.

In sections 2.3-2.7, certain specific aural acuities are examined in greater detail.

2.3 Rhythm and Metre

Practising musicians have long recognised hierarchical considerations in music; one of the basic tenets, strongly suggested by the historical development of music from its earliest beginnings, is that rhythmic accuracy is paramount before pitch accuracy. It is no coincidence that rhythmic skills are the first musical skills to emerge and to develop amongst infants (Hargreaves, 1986). Studies by Byo (1993, 1997) detected and reinforced a clear rhythm-pitch hierarchy. Sink (1983) points out that rhythm is more disruptive than melody to recognition behaviours. The purpose of Sink's study was to examine the effects of rhythmic and melodic alteration on rhythmic perception. The hypothesis Sink adopted was that there would be no effect of melodic alterations on perception of rhythmic dissimilarities; the hypothesis was supported by the study. Sink further reports that simultaneous presentation of melody and rhythm could result in reduced attention to absolute rhythmic structures.

Thus it is that the development of rhythm perception is a primary consideration in any aural training. Several well-respected philosophies of music education recognise this also, and utilise kinaesthetic activity to promote rhythm learning; indeed, the philosophy and work

of Émile Jaques-Dalcroze (1865-1950), for example, are fundamentally based on a kinaesthetic awareness of musical structure and experience through temporal/spatial activity.

Such approaches have produced their own success stories, and these are now increasingly supported by modern music education research. For example, a study by McCoy and Ellis (1992) found that the use of large muscle movements (e.g., marching, stepping, thigh tapping) to mark beat groupings while listening to rhythms promotes improvement, as well as achieving a positive affective result from the participants.

Hofstetter (1981) reports on a study of computer-based recognition of perceptual patterns and learning styles in rhythmic dictation exercises, in which analysis of the student data showed perceptual patterns and learning styles common to exercises in both simple and compound metres. Moreover, neither the speed at which the dictations were given nor the number of times they were repeated, both of which factors could reasonably be expected to alter the performance of students in the study, had a high correlation with student achievement. In addition, random variation of pitch and metronome stimulus both were shown to have no effect on student achievement. Hofstetter also identifies several confusions amongst the participants with respect to dotted, duplet and triplet notes, the dotted crotchet suffering from a surprisingly low percentage rate of correctness.

The results of a study by Fiske (1982) suggest that a hierarchy of processing difficulty is not absolute and that finite processing stages might not exist. Complex unknown musical phrases may require a note by note comparison whereas familiar phrases require less note by note comparison, but can take advantage of "chunking".

This idea is supported by Wang and Sogin (1990) who observe that the use of grouping (i.e., creating units for later recognition) is one of the earliest stages of perception. It would appear that subjects of the higher-training group in their investigation encoded into groups of notes of durable perceptual units, and that if melodic fragments did not conform to the encoded perceptual units, the ability to recall was diminished.

2.4 Pitch

For the purposes of this section, *pitch* will be deemed to relate not only to melody, but also to tonality and to sightsinging.

It is widely acknowledged that pitch perception is best understood in the context of collections of pitch, as any given single pitch has the capacity to belong to any one of many contexts; for example, Karpinski (2000) writes that effective sightsinging requires "the

appropriate diatonic pitch collection and tonic in mind". Such a concept is supported also by Taylor (1976), who averred that the perception of tonality requires identification of tonal centres or individual pitches to which all other pitches in the music seem related. He states that this is a judgement of degree, lying somewhere between aesthetic information and structural information. Shatzkin (1984) found that the tonic hypothesis proposed in his study on interval recognition in minimal context was supported, suggesting that instruction of sightsinging and melodic dictation should work with "small but meaningful groups of tones" rather than only with isolated intervals.

Chunking is another contextual skill which it is useful to develop in ear training. Karpinski (2000) describes "musically meaningful chunks: metric groupings, rhythmic patterns, scalar passages, arpeggiations, harmonic implications, and the like". Seashore (1938), although writing about perception of *rhythm*, mentions "an instinctive tendency to group impressions in hearing". Chunking may partly explain why Long (1977) found that M-shaped contours were more easily remembered than V-shaped contours, which agrees with Sloboda's observation (1985) that musical phrases which do not contain familiar patterns and structures do not readily lend themselves to memorisation.

Dowling, writing in Aiello (1994), states that melodic contour is a feature of the music that stands out distinctively for the listener on the first hearing; and Dowling and Harwood (1986), quoted in Radocy and Boyle (1988), suggest that contour, interval size and tonal scale system are important features in adults' perception of and memory for melodies. Radocy, quoted in Hodges (1980), states that research on pitch recognition and pitch production may have little to do with the perception of melody as melody *per se*, and clarifies the point a little later when he writes that the pattern rather than the particular pitches is what suggests a melody.

Taylor (1976) found that melody length and melodic contour did not seem to affect judgement of "tonal strength" values. He concluded that perception of tonality in melodies is a learned phenomenon. Thackray (1976) suggests that by the age of eight, children are able to tell clearly (i) when a melody has suddenly changed key, (ii) whether or not the melody had a clear key centre, and (iii) when a melody ended on a key note. Porter (1977) confirms that accurate pitch perception is a skill which can be learned.

It is important to consider and to give training in a variety of contextual settings because it is acknowledged that perception can vary according to context. It has been

reported, for example, that both performance and perception of melodies were less accurate for ascending patterns than for descending patterns (Killian, 1991). Dowling writes in Aiello (1994) that memory for contour can be affected by tonal context.

Stowasser (1991) described the "traditional" approach to aural training as a testing procedure rather than a learning experience. Stephens (2003) agrees, stating that repetition and testing can be useful measures of progress, but are not the best ways to develop musical understanding or personal musicianship. By contrast, Stowasser advocated an aural training method that followed the "mother tongue" approach which encourages students to develop the habit of memorizing a musical phrase, singing it to themselves, imagining how it would be played on their instrument, as well as utilizing solfege or letter name techniques. Such an approach recognises the value of multi-sensory learning experiences to reinforce concepts to be learned and developed, and can also be incorporated into tertiary music study (Stowasser, 2003). Taylor (1976) conjectured that hearing a melody twice *and* seeing the score provided subjects with more time and input for judging tonality. The findings of Larson (1977) support the use of melodic dictation in the development of *audio-visual* discrimination rather than as an end in itself.

The interlacing nature of pitch-related aural acuities requires that the aural training process should seek constantly to encourage transfer from each activity to the others. It is interesting to note, however, and without intending to contradict that one should teach for transfer (see section 2.2), that some transfer may occur more readily and naturally. It has been suggested, for example, that the effect of aural training by programmed instruction generalises to sightsinging ability (Carlsen, 1969), although it is clear that some skills are acquired with more ease. Results of a study of the relationship between melodic error detection, melodic dictation and melodic sightsinging (Larson, 1977), for example, showed that student achievement was generally highest in error detection, followed by sightsinging and then dictation. Differing melodic styles were not a significant influence. In addition, Porter's study (1977) gave no evidence that faulty singing is the result of inaccurate pitch perception.

Killian (1991) reports no significant overall difference between reading notation and reading solfege syllables, although unskilled singers scored higher using the syllables. She also found that melodic context seemed to make a difference in performance accuracy, that is, there was a trend toward more correct performance (sightsinging) and perception (error detection) of descending rather than ascending intervals and patterns.

Pitch work, whatever its nature, should not be confined to a single melodic line only; the inclusion of polyphonic work has benefits which are not otherwise derived from aural training. Small (1982), reported in section 2.2, is an example. Larson (1977) advocates the notion that ear training ought to include experience in more complex tonal idioms. Polyphonic contexts, in addition to the more usual monophonic contexts, promote this possibility.

Irrespective of the level of skill possessed by the student, it is important to realise that pitch perception is subject to the vagaries of the human condition, and that "off" days may be experienced from time to time. Simmonds (1978) reports in a study on relativity of pitch perception that pitch perception is dependent on the state of the listener, and that significant day-to-day variation in pitch judgements can occur caused by factors such as sleep deprivation, etc.

2.5 Interval Recognition

As with melody, context is important when considering intervals. Shatzkin (1981a) cites several researchers who have found significant context effects. As a result of his own study of interval and pitch recognition in and out of immediate context, Shatzkin advocates a contextual approach to interval work, noting that the number or type of error was affected by changes in context. His study found no evidence [amongst subjects not having absolute pitch] that pitch recognition ability aids interval recognition. Dowling (1982) states that intervals are easier to abstract from melodies that can be encoded in terms of a tonal scale. He also found that melodic intervals are encoded sufficiently well in tonal melodies so that they are recognised in transposition (although melodic intervals are difficult to encode in atonal materials), and that it was much easier to transpose a familiar tonal melody than to transpose isolated intervals.

Tessitura is one contextual factor to consider; it was observed by Shatzkin (1981a) that the higher the pitch, the more successfully intervals were recognised.

Another context is interval direction. Bentley (1973) reports the tendency for upward movement to be more difficult to discriminate, by a proportion of 9:1, when frequency differences are smaller than a quarter tone; and that there is a tendency for subjects to favour "down" judgements rather than "up". He also reported the tendency for descending intervals to be sung more accurately than ascending intervals. According to Radocy (1978a), there was

a tendency for descending intervals to be heard as larger. In addition, he found that nonmusicians tend to hear intervals as wider than musicians hear them.

2.6 Computer-Assisted Instruction

Carlsen (1969) reported findings that the ability to perceive music in context (i.e., tonal melodies of at least one phrase which are essentially major or minor, utilising direction change from any scale degree, containing intervals of an octave or less, and using simple and compound metre, and some syncopation including hemiola) could be developed as effectively by programmed instructional materials as is normally done by a classroom teacher, and that students with a high mathematical ability performed significantly better in the programmed materials than in the class situation. At around the same time it was reported by Allvin (1970) that the introduction of CAI had had an effect of forcing educators to re-evaluate teaching theory, stating that it could augment the resources of the classroom teacher and that learning could be guided by the flexible give and take possible with the computer. Allvin further stated that sound-to-sight and sight-to-sound skills could be developed with equal effectiveness. Canelos, Murphy, Blombach and Heck (1980) also reported that mastery learning with CAI was significantly more effective than either programmed instruction via printed text or self practice. Furthermore, they reported that learners in their study showed a strong preference for CAI over the other alternatives.

CAI has been used for the development of several aural acuities, for example,

- harmony (Hofstetter, 1978, 1980);
- interval work (Hofstetter, 1979; Gibson, 1986);
- intonation (Dalby, 1992);
- metre (Walls, 1999);
- pitch (Peters, 1993);
- rhythm (Hofstetter, 1981; Peters, 1993; Walls, 1999).

Deal (1985) writes that the ease of repeated hearings through CAI may not be so important an advantage as had earlier been believed. The lack of specific feedback may counteract the benefits of repeated hearings. Peters (1993) produced a software package by 1992 which was the first in a series of tutorials which allow students to receive feedback on their vocal or instrumental performance. The results of a study by Carlsen (1969) raise questions as to what extent practice affected the development of aural perception. A

subsequent investigation revealed no significant difference which could be considered a function of practice, although the small sample used for the investigation precluded making a generalised statement.

By contrast, Hofstetter (1978) reported that students performed better on [harmonic] skills that were frequently featured in the curriculum, going on to suggest that a method to increase achievement is to increase the percentage of times such skill tasks are repeated.

It seems that using CAI has benefits in assisting students to concentrate, with consequent improvement in learning. Willett & Netusil (1989) found that computer drill focussed better the attention of the fourth grade students in their investigation. A study by Hofstetter (1979) found that students using CAI learned significantly more and made better use of their time than students who were not using CAI.

However, not all studies report positively on the effects of CAI. Noting that interest in music technology has increased, Butler (1997) queries whether CAI is used only as a different method of delivering the same product. Rives (1970) found no significant difference in listening achievement in a comparative study of traditional and programmed methods for developing music listening skills in fifth grade. Hofstetter (1979), notwithstanding that the students using CAI in his study learned more efficiently, reported that these same students felt they were always being tested regardless of whether they felt ready for it. They were unaware in the study of the benefits they gained from CAI, but expressed a higher frustration level, believing they used their time simply getting through the material rather than trying to learn. Walls (1999) concluded in a study using elementary school students that greater rhythm discrimination is achieved from a traditional approach to general music education than from computer-assisted music instruction.

An increasing number of music educators, however, have expressed dissatisfaction with traditional methods, preferring a more holistic and “realistic” approach. Stowasser (1991) does not stand alone when she describes the traditional approach as an environment of constant testing rather than learning. Stevens (1991) described CAI as computer-centred and behaviourist. He advocated a more eclectic approach to the use of computer technology in the classroom, stating it had also been used as a tool for creative music making through the use of the computer as a learning environment, a learning tool or a personal tool, thus engaging in a much less structured approach.

Walls (1999), reviewing a dissertation by Arms (1997), notes the remark that the pace of CAI may be too fast for students to understand fully the concepts presented; but he also

suggests that too fast a pace may be caused by faulty selection and timing of computer lab assignments, expressing a concern as to whether the subjects believed they had sufficient time for each computer assignment.

Nevertheless, a number of aural training packages are available on the market and many enjoy a continuing popularity. The earliest were released in the early to mid-1990s. In a Master of Music dissertation, Douglas Spangler records over 60 and evaluates 30 aural training software programs. His evaluations may be accessed at the URL
< https://www.msu.edu/user/spangle9/etsoftware.html>.

A summary of six well-known packages is provided here.

Auralia is an interactive software product with graded ear training and aural exercises including interval and chord recognition, chord progression analysis, melodic dictation, rhythmic dictation and recognition, and work in intervals, melody, chords and counterpoint singing. Students are provided with on-screen feedback to their answers. *Auralia* has a tandem software product, *Musition*, which teaches music theory. The range of difficulty spans approximately Grades 5-8 in ABRSM Theory, but also provides self-training opportunities for students wishing to practise the aural component of their practical exams (e.g., cadence recognition).

EarMaster School 5 is an interactive graded ear training programme with exercises in identifying intervals, chords, chord inversions, chord progressions, scales and modes, transcribing melodies and rhythms and sight-reading or imitation of rhythms.

MacGamut, designed by Ann Blombach at Ohio State University, has been developed over two decades. The first edition in 1988 was limited to interval, scale and chord drills and was available only for Macintosh computers. Harmonic dictation was added in 1996. In 2000 the software application became available for Windows computers, making it more widely available. Rhythmic dictations were added in 2003. The 2008 edition includes written and keyboard drills.

Tomasz Spiewak's aural training book series was first published in 1991. Teacher manuals were published with a CD of music files. The CD has been discontinued in the current four-volume edition of *Aural Training for Musicians and Music Students*, and the sound files are now delivered online via MP3.

Leo Kraft has produced several books on aural skills including *A New Approach to Sight Singing* (with Sol Berkowitz and Gabriel Fontrier), *A New Approach to Keyboard Harmony* (with Allen Brings et al.) and *Gradus*. The most recent, *A New Approach to Ear*

Training, includes an audio CD. The text is designed to be used either as a class text or as an individual workbook for students.

The sixth edition of Benward and Kolosick's *Ear Training: A Technique For Listening* is a text on aural training and delivers sound files to students online via MP3 files.

To summarise, it appears from the literature that CAI has many benefits and has been found to be effective in many instances; however, there are those who question whether it is the *mode* of instruction (i.e., using computers) that is effective as opposed to the *design* of the instruction, suggesting that well-designed learning programmes are effective irrespective of the method of delivery.

The University of Southern Queensland offers many courses, including music courses, both in the traditional face-to-face classroom environment and by external delivery. The Distance Education Centre strongly recommends that content and learning strategies should be as similar as possible (if not identical) for both modes when the materials are developed. This provides a highly suitable setting in which to conduct a research project that seeks to compare the learning outcomes of students enrolled in different modes (i.e., internally *versus* externally) of the same course.

Chapter 3

Background to the study: development of the materials and teaching methodologies used

3.1 Outline of the Chapter

This chapter describes the pedagogical basis and practical considerations used by the researcher for developing the aural materials at the University of Southern Queensland, and describes also the elements of the aural course in general, and for *Music Craft 1* (the focus of the research project) in particular. The context into which *Music Craft 1* fits is given first to provide a background setting to this information.

3.2 The Context of *Music Craft 1*

Information for sections 3.2 and 3.3 is sourced from the USQ Handbook which at the time the tests were conducted was readily available in print form as well as from the university's internet site. At the time of writing, print copies are available only to selected staff, otherwise it is located at the URL <www.usq.edu.au/handbook>.

3.2.1 Bachelor of Music

The Bachelor of Music programme is the mainstay of the Music programmes on offer at USQ. It is six semesters in duration (full-time, or up to 14 semesters part-time). The aims of the programme are

- to produce musicians who will have a specialised and high standard of expertise in a particular aspect of practical music;
- to develop in students a wide basis of musical knowledge, understanding and experience through study of the literature of music and participation in group musical performance activities;
- to develop in students an awareness of the rôle which music can play in human expression through the study of a number of different but related areas of music;
- to provide an opportunity for students to develop their particular vocational interests;
- to provide a programme of study that will enable students to display high levels of expressive skills, perceptual awareness and independence of imagination.

At the time the research project was carried out the recommended enrolment pattern was as shown in Table 3.1.

Table 3.1

Recommended Enrolment Pattern for Bachelor of Music Students

Year 1	**Semester 1** MUS1001 Performance 1 MUS1021 Music Craft 1 MUS1031Music History 1 CMS1000 Communication & Scholarship **OR** ASD1000 Reading & Writing Across the Disciplines
	Semester 2 MUS2002 Performance 2 MUS2022 Music Craft 2 MUS2032 Music History 2 CSC1400 Introductory Computing
Year 2	**Semester 1** MUS2003 Performance 3 MUS2023 Music Craft 3 MUS2033 Music History 3 Music or other approved elective
	Semester 2 MUS2004 Performance 4 MUS2024 Music Craft 4 Australia, Asia & the Pacific Music or other approved elective
Year 3	**Semester 1** MUS3005 Performance 5 MUS3025 Music Craft 5 MUS3051 Music Project 1 Music or other approved elective
	Semester 2 MUS3006 Performance 6 MUS3026 Music Craft 6 MUS3052 Music project 2 Music or other approved elective

The Performance courses consist of both solo and ensemble studies. The Music Craft courses comprise two modules, designated Module A (Writing Techniques) and Module B (Aural), with the addition of a Dalcroze module (designated Module C) for on-campus students in *Music Craft 1* and *Music Craft 2* only. The three Music History courses cover western music from mediaeval times to the present, with some ethnomusicology and the development of Australian music. The four elective courses can be chosen from Music (studio teaching, accompaniment, chamber music, concerto performance, musicology, and languages and phonetics for voice students), or, for students considering a career in secondary teaching, an approved elective in another teaching subject. The two Music Project

courses allow students to specialise further in a range of career-focussed areas such as second instrument study, music administration, conducting, chamber music, additional (specialised) repertoire for the principal instrument, or other approved courses. In addition, all USQ students must study three core courses – *CMS1000 Communication & Scholarship* (or *ASD1000 Reading & Writing Across the Disciplines*), *CSC1400 Introductory Computing*, and *AST1000 Australia, Asia & the Pacific*. In more recent times, it has been permitted to replace AST1000 with a course chosen from an approved selection of courses.

The combined Bachelor of Music/Bachelor of Education degree programme is administered by the Faculty of Education, has a duration of eight semesters for full-time students, and in the musical aspects has the same aims as the Bachelor of Music. Education courses are studied throughout the entire programme, although the majority of them are scheduled in the fourth (final) year. This means that, for the first three years, the enrolment pattern is substantially the same as for the Bachelor of Music degree except that the electives are replaced by Education courses. The Music Craft enrolment is identical in both degree programmes.

Bachelor of Arts students may enrol in Music electives or a Music major as part of their degree, which has a duration of six semesters full-time. In either case, Music Craft courses are available for selection. It is therefore not unusual, albeit uncommon, for *Music Craft 1-4* cohorts to include one or more Bachelor of Arts students.

3.2.2 The Certificate and the Diploma in Music Teaching

The Certificate in Music Teaching has not been offered since all university certificate programmes were withdrawn by QTAC in December 2004. (The Diploma in Music Teaching continues to be offered and attracts a regular enrolment.) At the time the research project was conducted, the Certificate and Diploma programmes were the ones with the greatest number of external enrolments, being available only in external mode. Since then an increasing number of Bachelor of Music students have opted also to enrol externally in one or more courses each semester. This allows students greater flexibility in timetabling which they find attractive because of the increasing need of students to work to earn money to support their study.

The Diploma in Music Teaching programme is available in piano, violin/viola, flute, clarinet and voice. The Diploma programme consists of four courses of Music Craft and four

courses of Studio Teaching (pedagogy) as shown in Table 3.2. The pedagogy courses cover instrumental teaching from beginner to Grade 6 standard, or higher.

Table 3.2

Enrolment Pattern for the Diploma in Music Teaching Programme

Year 1	**Semester 1** MUS2041 Studio Teaching 1 MUS1021 Music Craft 1
	Semester 2 MUS2042 Studio Teaching 2 MUS2022 Music Craft 2
Year 2	**Semester 1** MUS3043 Studio Teaching 3 MUS2023 Music Craft 3
	Semester 2 MUS3044 Studio Teaching 4 MUS2024 Music Craft 4

The aims of the programme are

- to produce graduates who have a sound foundation in musicianship and music teaching;
- to develop in students musical skills that will provide them with the substantial background necessary for successful music teaching;
- to develop in students high quality teaching skills necessary for successful teaching practice.

It is expected that on successful completion of the programme, the student

- will have developed expertise in teaching instrumental or vocal students from beginner to lower advanced levels;
- will have achieved an intermediate standard basis in aural development and music writing techniques.

The former Certificate in Music Teaching programme comprised Year 1 only of the Diploma progamme.

3.2.3 The Associate Degree in Music

The Associate Degree programme is designed primarily for those who wish to become studio music teachers or to consolidate their studio music teaching experience, but who want a more rounded study programme. Its aims are substantially the same as for the Bachelor of Music. The programme for this course is shown in Table 3.3.

Table 3.3

Enrolment Pattern for Associate Degree in Music

Year 1	**Semester 1** MUS1001 Performance 1 MUS1021 Music Craft 1 MUS1031Music History 1 MUS2041 Studio Teaching 1[1]
	Semester 2 MUS2002 Performance 2 MUS2022 Music Craft 2 MUS2032 Music History 2 MUS2042 Studio Teaching 2[1]
Year 2	**Semester 1** MUS2003 Performance 3 MUS2023 Music Craft 3 MUS2033 Music History 3 MUS 3043 Studio Teaching 3[1]
	Semester 2 MUS2004 Performance 4 MUS2024 Music Craft 4 MUS3044 Studio Teaching 4[1] CMS1000 Communication & Scholarship **OR** ASD1000 Reading & Writing Across the Disciplines

[1] or other approved elective

3.3 Audition Requirements

Students can enrol in music programmes only by successful audition. The audition procedures and requirements differ depending on the programme the candidate wishes to pursue.

3.3.1 Bachelor of Music and Bachelor of Music/Bachelor of Education

The audition requirements for these two programmes are identical. Applicants should normally

- have completed at least 5th grade Theory or Musicianship (AMEB) or equivalent;
- have at least High Achievement (HA) for BOSSS Music for Years 11 and 12 in secondary school;
- have approximately grade 7 standard (AMEB) depending on instrument;[6]
- have English level IELTS 6 for international students.

The audition process involves not only practical demonstration by performing two contrasting pieces, but also an interview, and the completion of written tests in theory, aural ability, and music history and general musical knowledge. The auditions take place in September and November of the year preceding the commencement of study.

3.3.2 Music within the Bachelor of Arts

Prospective students wishing to enrol in music courses within the Bachelor of Arts may select from Music Performance, Music Craft and Music History. For Music Performance the audition requirements are the same as for the Bachelor of Music, but acceptance is also governed by staff availability and funding considerations. The auditions take place in the orientation week in February of the year that study is commenced. For Music Craft and Music History, prospective students must have at least High Achievement (HA) for QSA Music for Years 11 and 12. If they do not, then they must sit the appropriate entrance test to determine whether they should be accepted. This takes place in the same week as the practical auditions for Bachelor of Arts students.

3.3.3 Certificate in Music Teaching and Diploma in Music Teaching

At the time the research was conducted, students could enrol directly into either the Certificate or Diploma programme; however, since the courses studied in the Certificate articulated into the Diploma, some students opted to enrol initially in the Certificate and transfer later to the Diploma. For this reason, audition requirements for both programmes were identical.

[6] The requirement to meet this standard may be waived for vocal candidates, for whom physical maturity is an important consideration in assessing executive standards.

Although no practical instrumental tuition forms part of these programmes, prospective students must demonstrate an acceptable level of executive ability on the basis that studio teachers should be able to demonstrate to their students. Some assessment in the Studio Teaching courses requires students to perform and to discuss relevant repertoire for their instrument. The admission requirements are

- successful completion of Year 12 or equivalent, or mature age with substantial music teaching experience;
- practical qualifications of grade 7 (AMEB) or higher at credit level, or equivalent, completed within five years of the year of anticipated entry (or within the last two years for vocalists), or successful live or video audition;
- a pass at credit standard or higher in 5th grade (AMEB) Theory or Musicianship, or equivalent;
- English level IELTS 6 for international students.

3.3.4 Associate Degree in Music

Audition requirements for the Associate Degree in Music are

- successful completion of Year 12 or equivalent, or mature age entry;
- successful audition in the chosen instrument of study at approximately grade 7 (AMEB) or higher;
- at least grade 5 Theory or Musicianship (AMEB) or equivalent;
- English level IELTS 6 for international students;
- in addition to the practical audition, candidates must attend an interview and complete music theory, aural, and music history and general music knowledge entrance tests.

3.4 Pedagogical Foundation of the Concept of Music Education at a Distance

It has been a belief at USQ for many years that pedagogically, it is possible to assist student learning in many disciplines without requiring them to attend on-campus. While it is not always possible for all aspects of music to be taught effectively through distance mode, it

is a fundamental belief of the University that it is possible to assist in most instruction; it is a matter of finding the most appropriate strategies. Modern technological advances help to provide this.

In general, results of assessment of music students studying in two different modes (or a mixture of both) have indicated that there is little difference between them (see Table 1.1). In many cases the development of younger students through on-campus social and teaching interaction perhaps may be matched by the dedication and prior experience of often-times more isolated, mature age external students.

The external model adopted by USQ involves directed study and presumes a student's self-motivation. It encourages personal interaction between staff and students, and between students, through telephone discussions, internet discussion groups and video conferencing, internet email correspondence and voluntary residential schools.

In music courses offered externally, as much music-making as possible is encouraged. Not all of this is assessed but self-review is encouraged. Most of this involves singing (in aural training) and playing of examples (where students have a minimum of keyboard skills).

3.5 Student Perceptions of Study via Distance Education

Students seem in general to be pleased with the curriculum they are required to study. By way of example, students enrolled in 2000 in *Music Craft 2* were asked to respond to the question: "All things considered, how would you rate your overall satisfaction with the unit?". Responses were given on a scale of 7 to 1, where 7 is *excellent* and 1 is *very poor*. The mean average response from a 60% response rate (n=15) was 6.2.

In August 2001, a graduated Diploma student wrote in *Bravura*, the quarterly journal of the Music Teachers' Association of Queensland, that "aural work . . . seems a little daunting at first, [but] the exercises provide a fantastic and sequential avenue to increased aural acuity" (Gatz, 2001).

3.6 Conceptual Foundations of Aural Development

3.6.1 Principles

The Department of Music at USQ is committed to the formal involvement of students in aural development. This commitment to classes and exercises over six semesters is

designed to complement the work undertaken by staff practical teachers as an integral part of their instrumental or vocal lessons.

Apart from those who become orchestral musicians or enter opera companies, many USQ Music graduates enter employment as secondary school teachers of either classroom or instrumental music. The content indicated in section 3.6.2 comprises a sequenced program that is designed to enhance and focus the aural acuity of students. It is based on the assumption that carry-over from the formal, focussed programme to the musical aspects of practical performance and listening to musical repertoire should be part of the teaching and learning process.

When the University of Southern Queensland proposed that aural perception would be offered for external students in 1997, the aim was to convert the on-campus aural training programme of the time as nearly as possible into learning modules for external students using distance education materials. The six-semester on-campus course had been designed by the researcher in 1992, based on ten years' experience as a secondary music teacher which had provided a firm grounding in teaching aural skills to secondary students aged from 12 to 17 years. Further, this programme articulated with the aural skills levels of school leavers beginning their tertiary music studies and aimed to develop their skills to the level required by music graduates working as professional musicians. From 1992 to 1997 the on-campus programme had been ongoingly reviewed and developed by the researcher, and anecdotal feedback from graduates entering the music profession clearly indicated that the aural training programme was fulfilling its aim.

As a prototype distance mode aural training programme, it was necessary to determine whether the experimental teaching methods would work for the external mode of teaching. Existing CAI programmes in aural were mostly aimed at primary and secondary school children. To that date there was no proven tertiary aural training programme delivered entirely via distance education that had been shown to perform equally well as or to perform better than face-to-face aural teaching. The early success of the external students in achieving higher average results in all acuities compared with the on-campus students was a welcome outcome. As a result of the success achieved by the students using only distance education materials, later classes of on-campus students have been required to use the distance education materials as part of their private study.

3.6.2 The Course Elements

Several areas are covered by the aural work, each treated largely in a sequential manner. The descriptions that follow include all six semesters in order to place the aural work from *Music Craft 1* in context.

3.6.2.1 Rhythm

In semester 1 all rhythms are in 4/4, beginning with simple rhythmic elements (crotchet, quaver pairs, crotchet rest). New rhythmic elements are added most weeks throughout the semester. The aim is for students to develop a stronger sense of pulse – which Karpinski (2000) describes as the most fundamental of the temporal aspects of music – and exercises are designed so that the crotchet pulse is the basic unit. In semester 2 the principal aim is to develop the rhythmic memory and a feel for rhythmic phrasing. Compound time signatures are introduced in semester 3, using 3/4 as a link to 3/8, again commencing with simpler rhythmic figures and adding new figures weekly throughout the semester. As the semester progresses, 6/8, 9/8 and 12/8 are added, thereby increasing the length of the rhythms. Semester 4 deals principally with 6/4 but also involves revision of other simple and compound meters. Semester 5 introduces the "uneven" time signatures 5/4, 5/8, 7/4 and 7/8, utilising a variety of accenting patterns. Semester 6 uses mixed meters in different pairings (eg 3/4 and 6/8 or 4/4 and 3/8) in which the time signatures alternate bar by bar.

3.6.2.2 Intervals

In semester 1 all chromatic intervals up to and including the perfect octave are used. In semester 3 compound intervals from perfect octave to perfect 15th inclusive are used. These are the only two semesters in which interval work is addressed discretely.

3.6.2.3 Melody

In the first semester rhythms are initially provided so that the student may focus exclusively on the pitch information. Nursery and folk tunes are used to provide an "authentic" context and because of their familiarity and their relatively simple structures which use mostly stepwise or triadic movement. Longer melodies later in the semester feature repetition of musical material as commonly found in folk material. Semesters 3 and 4 introduce the idea of simple forms (binary, ternary) within the melodic work, as well as common modulations. In semester 5 melodies are written in C clefs (including soprano clef),

and structured in a similar format to those from semesters 3 and 4. These melodies are specifically constructed and utilise rhythms which are motivic and motoric, lending themselves to memorisation. In semester 6 actual examples from the repertoire are used, with no particular sequence, encouraging students to draw on all skills developed in the previous semesters. While the work in the first two semesters is presented by piano only, in subsequent semesters a variety of instrumental timbres is used.

3.6.2.4 Singing

The first semester includes many singing exercises designed to develop in the student an awareness of various patterns of notes, both melodic (in the form of scales and modes where patterns of tones and semitones must become apparent and well known to the student) and harmonic (in the form of triadic singing exercises). These should serve as a basis for developing memory work and for all pitch work in this and succeeding semesters' courses. Canons are sung in all semesters, one per week. This, of course, is designed so that the student may sing an independent part within an ensemble context, which helps to develop intonation, inner hearing, and the ability to deal with more than one part simultaneously. This, of course, is designed so that the student may sing an independent part within an ensemble context, which helps to develop intonation, inner hearing, and the ability to deal with more than one part simultaneously, and thereby creates an atmosphere in which transfer to multi-part dictation exercises can successfully be made.

3.6.2.5 Harmony

An understanding of harmony and an ability to hear harmonic implications is an important part of the musician's tools of trade. In semester 2, work covers recognition of triads and chords of various qualities and positions, leading to cadence recognition and then to short stock progressions of four chords. In semester 3 students are required to recognise a number of different progressions of seven chords. Transfer of understanding of harmonic progressions to multi-part work is encouraged.

3.6.2.6 Polyphony

Semester 3 introduces two-part work (treble and bass), initially with a basic bass using tonic, dominant and subdominant, then progressing by utilizing inversions and then passing notes to create a more fluid, interesting and independent bass line. Various timbres

are used, for example, piano, oboe and bassoon, violin and cello. The parts are of similar difficulty to the melodic dictations of semester 1. In semester 4, three-part work is encountered (two treble and one bass, one treble and two bass), leading to four-part work in semester 5 and finally to orchestral dictation in semester 6. Semester 5 begins with single chords, leading to cadences (i.e., two chords), stock three-chord progressions, then several pieces with identical rhythm (so that pitch may be the exclusive focus) and then to simple chorales for which the student must additionally supply the rhythm. Semester 5 links to semester 6 by revising four-part work, transferring then to four-part string orchestra, and gradually introducing sustained horn/trumpet parts and then woodwind parts, to build up to a standard classical orchestra. Exact pitch is not the expectation here, but rather that the student will observe the correct type of timbre in the correct register or tessitura. Piano reductions are provided to assist the student with the pitch material.

3.6.2.7 Other

Exercises are provided in recognition of *Dynamics* (semester 4) as well as for *Phrasing and Articulation* (semesters 5 and 6). Students are provided with blank scores on which they mark, as appropriate, the dynamics or add staccato dots, phrasing slurs, accents and tenuto marks as heard on the CD. In semester 5 this involves a single melodic line; in semester 6 short two-part pieces are used.

3.7 The Development Process

The CD-ROM for aural training was developed in a three-part process.

3.7.1 The Content

As the first part of the process, a three-year, six-semester aural development program was conceptualised and examples and exercises devised and prepared by the researcher. This includes two assignments and one end-semester examination for each of the six courses.

3.7.2 The Sound Files

Secondly, the aural examples which had been devised by the researcher were technically prepared by Associate Professor Laurence Lepherd, a staff member of the USQ Music Department, using a midi keyboard controller to Computer 1 that has Cubase VST

Score 3.5 installed. This was connected to Computer 2 that had Gigasampler installed. Piano sampling (Gigasampler) was of a Yamaha D7. Orchestral excerpts were taken from Akai format Peter Siedlaczek's Advanced Orchestra series and Prosonus Orchestral collection. Audio recording was carried out through the Gigasampler sound capture facility. Audio files were edited and resampled to 22,050 Hz to enable all sound examples to be included on one CD (Sound Forge 4.0). Directions were given in text format, and notation was prepared from Cubase score using Snagit and outputting to a 2 bit BitMap file. This reduced the load time, especially when pages needed to be loaded in sequence during canon exercises.

3.7.3 The Hardware

Thirdly, the required files were loaded into an engine developed with Macromedia Director 8 by Mr Ken Morton of the USQ Distance Education Centre (DEC). This was followed by the manufacture of the CD-ROMs with the exercises, the audio CDs of the assignments, and the printing of the Introductory Books (one of which is prepared for every USQ external course) by DEC technical staff. A copy of the relevant section of the Introductory Book, for *Music Craft 1* is to be found at Appendix A, while the aural training CD-ROM is to be found at Appendix B.

3.8 The Content of *Music Craft 1*

The content of *Music Craft 1* forms the treatment for the research project. The scope of the PhD determines that evaluation of one course of the programme is sufficient; it would be unrealistic to evaluate all six semesters. *Music Craft 1* and *Music Craft 2* are the two courses of the six which, at the time of the research project, had the highest enrolments because they were included in the greatest number of programmes. *Music Craft 1*, being the introduction to the aural work, was the logical choice. In *Music Craft 1*, six elements are treated:

- rhythmic dictation;
- pitch (scales and modes) recognition;
- interval recognition;
- singing;
- canon;
- melodic dictation.

Exercises in each of these areas are set for each day of each week, and while a particular sequence of exercises is built into the CD-ROM, students are encouraged to use the material imaginatively if varying the approach is helpful to their own learning style. Some examples of this are discussed in section 3.10.1.

3.8.1 Rhythmic Dictation

There are ten exercises in each of 13 weeks, all in 4/4 time. Each rhythm is played three times (except in weeks 1 and 2 when they are played only twice) with a timed pause of 30 seconds between each playing. Students check their answers from an answer screen available from the CD-ROM.

Table 3.4 shows how rhythmic elements are introduced throughout the semester. In order to facilitate the transcription of rhythms as they are heard, students are encouraged to develop a rhythmic shorthand which will maximise the accuracy and the amount of information they write on the page in a small amount of time. Various possibilities are described and illustrated in the Introductory Book, and students may select the method, or mix of methods, that suits them best. The principle with each method is that the student should aim to write rhythmically.

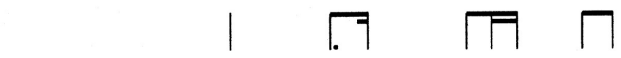
The first of the three suggested shorthand methods is a visual/spatial approach using dots or oblique strokes to represent the note heads. These will be grouped into visually discrete crotchet units, with note heads spaced appropriately. For example, the rhythm

would be written thus

with beams and stems added later to render a conventional notation.

In the second method, only the stems are written while transcribing the rhythm, with the same visual and spatial implications as the first method. The rhythm above would be written thus

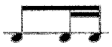
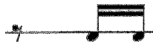
and requires only the beams to be added to render conventional rhythm notation:



The third method requires the student to prepare a vertical stroke for each crotchet unit. The rhythm is then written by making oblique strokes through the vertical strokes. The longer the note value, the longer the stroke. Using this method the example rhythm would be represented thus

Table 3.4

Music Craft 1: elements used in rhythmic dictation

Week	Length	Rhythmic elements used	Played
1	4 bars		x 2
2	4 bars	plus 	x 2
3	6 bars	same as Week 2	x 3
4	6 bars	plus 	x 3
5	8 bars	same as Week 4	x 3
6	8 bars	plus 	x 3
7	8 bars	plus 	x 3
8	8 bars	plus 	x 3
9	8 bars	plus 	x 3
10	8 bars	plus 	x 3
11	8 bars	plus 	x 3
12	8 bars	plus 	x 3
13	8 bars	plus 	x 3

The timbre used for the rhythms is that of a woodblock. Two different pitches are used, one for the preparatory bar of four crotchets which precedes the rhythm and establishes the tempo, and another for the rhythm itself. It could be argued that woodblock sounds do not sustain, and that it is therefore possible a rhythm might not be transcribed with complete accuracy because, for example, it would not necessarily be possible to appreciate the difference between a crotchet or a quaver and a quaver rest. This is acknowledged, and a certain flexibility is therefore permitted in students' answers (detailed in chapter 4); but it was considered preferable to use a percussion timbre rather than to present the rhythms either melodically or with a single but sustained pitch. This allows the student to focus without distraction purely on the rhythmic aspect. This idea is also supported by Boisen (1981), who reported no difference in accurate perception of rhythmic completeness or incompleteness caused between single-pitch melodies and matching melodies. (For internal students, the rhythms are clapped and a preparatory bar is counted orally by the lecturer.)

3.8.2 Pitch (Scales and Modes)

The scales covered are major; harmonic, melodic and natural minors; pentatonic; wholetone and chromatic; the modes are dorian, phrygian, lydian, mixolydian and aeolian. The scales and modes are heard on the CD-ROM.

3.8.3 Intervals

Students are to listen to and to sing the exercises provided on the CD-ROM. There are twenty exercises set for each week. In the first week only the perfect 4^{th}, perfect 5^{th} and perfect octave are featured. In the second week the major 2^{nd}, 3^{rd}, 6^{th} and 7^{th} are added, and in the third week the minor 2^{nd}, 3^{rd}, 6^{th} and 7^{th} and the augmented 4^{th} are further added. The intervals are played melodically and, in order to develop familiarity more quickly and thoroughly, in this part of the course are not placed contextually. Both ascending and descending intervals are used. Bentley (1973) reports the tendency for upward movement to be more difficult to discriminate, by a proportion of 9:1, when frequency differences are smaller than a quarter tone; and that there is a tendency for subjects to favour "down" judgements rather than "up". He also reported the tendency for descending intervals to be sung more accurately than ascending intervals.

3.8.4 Singing

The purpose here is to develop inner hearing through improving outer hearing by working to develop an accurate (in tune) aural memory for important pitch patterns – scales, modes and intervals – and by singing them in tune. For scales and modes, students are asked to create consciously the patterns of tones and semitones required, and to develop an awareness for the unique rôle or function of each pitch in the scale or mode. For example, the function of the leading note is to rise to the tonic; the tendency of the supertonic is to resolve downward to the tonic; the rôle of the dominant is to lead to the tonic, either directly or via another pitch or pitches (5-1^1, 5-7-1^1, or 5-6-7-1^1, for example). The singing exercises will help to develop this awareness which in turn can be helpful in transcribing melodic dictation.

3.8.5 Canon

The singing of canons, that is, singing in a polyphonic context, is considered an important part of the course; this is supported by the findings of Small (1982) cited in chapter 2. In the external mode, the CD-ROM provides students with a computer-generated performance of the canon melody against which (or with which) the student will sing.

One canon is set for each week of the course. The canons are selected from *Classical Canons* edited by Antal Molnár and published by Editio Musica Budapest. The external and internal students study the same canons. On the first day, the student hears and learns the canon; the CD-ROM provides a score (see Figure 3.1) and an audio file of the melody. The first bar of the score and of the audio file give the starting note, so the canon proper commences in the second bar shown. Numerals within a rectangle beneath the stave indicate when the canonic entries occur. In Figure 3.1, the canon proper, and thus the *dux* (first voice), enters at bar 2; the *comes* (second voice) enters at bar 5 where the numeral 2 is located, and the third voice at bar 9 where the numeral 3 is placed. The scores shown in Figures 3.1 – 3.5 are replicas of what the student views on the computer screen when singing the canon exercises.

On the second day the score shows two parts but plays only one – the student is expected to sing the second part, as shown in Figure 3.2 by the inclusion of the numeral 2 beneath the stave at bar 5. There is now no longer any need to give the starting note, so the first entry begins at the first bar of the score. On the third day, three parts are shown on the score but only two are played while the student should sing the third part (see Figure 3.3).

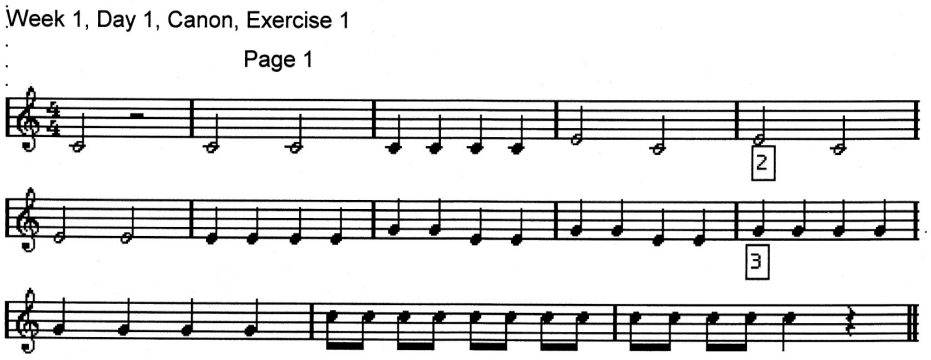


Figure 3.1. Example canon score: Day 1 (Molnár, no. 195)

For students who are not strong at holding a part it is suggested in the Introductory Book that they should sing *with* one of the computer-generated voices until they gain greater confidence. If the canon has more than three voices, this procedure continues daily until all parts are represented.

The canon for week 1 is a simple chordal example, used in Figures 3.1 to 3.3. Other canons in the course feature particular scales, modes or intervals and are related in this way to work covered in the singing element of the course. By way of example, the canon for week 3, which utilises expanding chromatic intervals within a perfect octave (see Figure 3.4), is designed to complement the singing exercises for that week in which all the chromatic intervals are used.

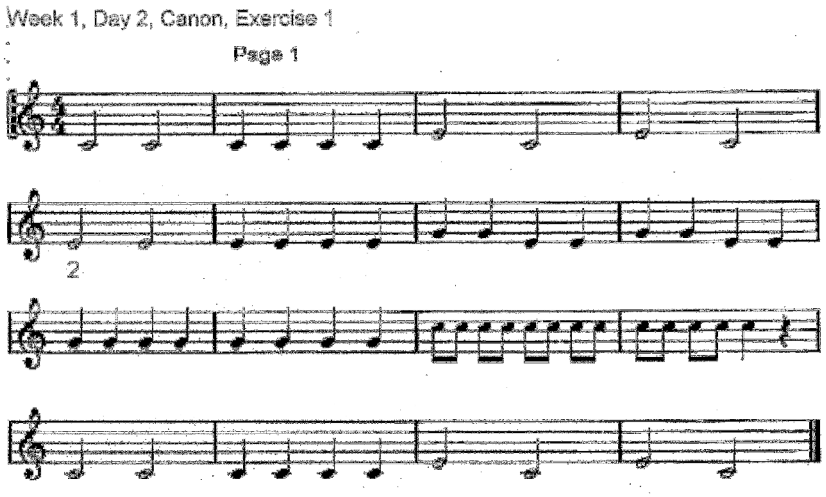


Figure 3.2. Example canon score: Day 2

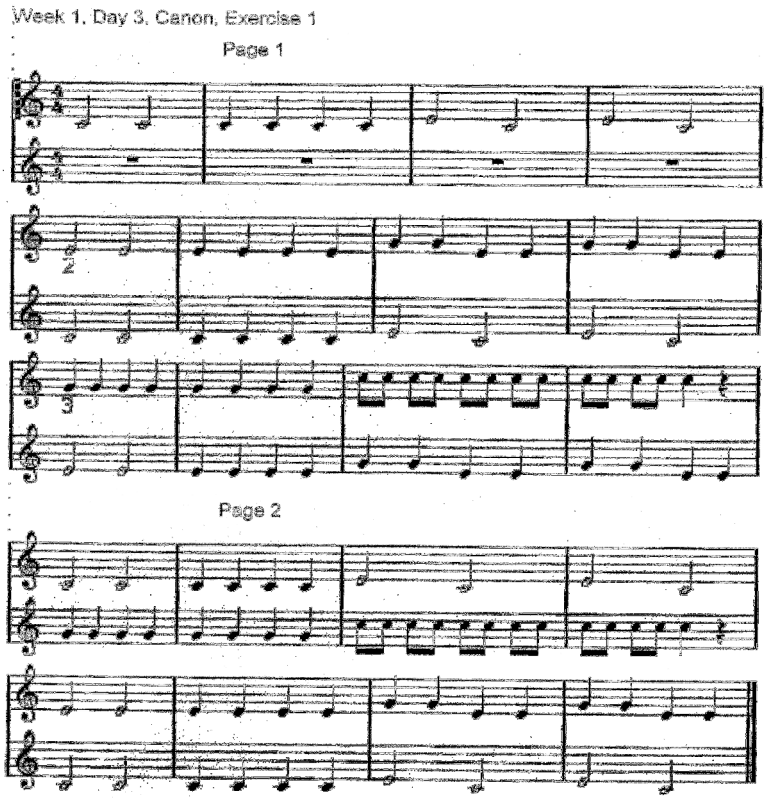


Figure 3.3. Example canon score: Day 3

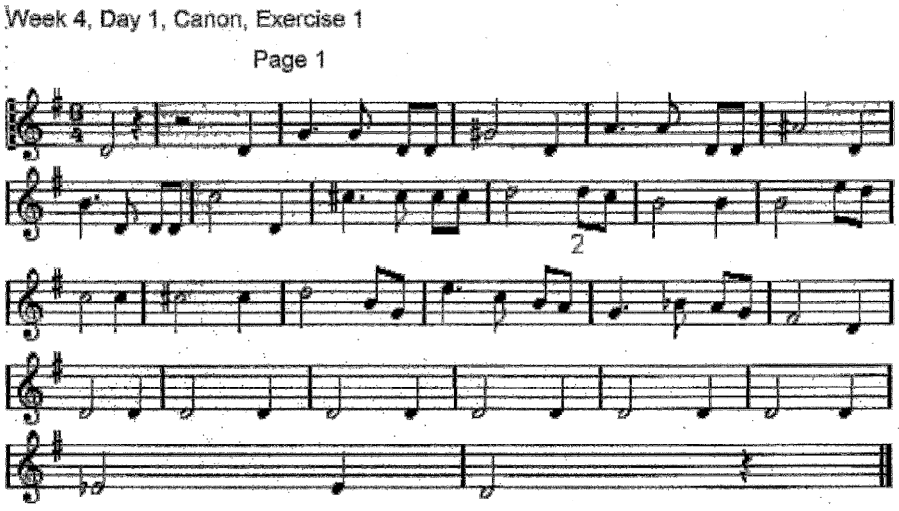


Figure 3.4. Canon with expanding chromatic intervals (Molnár, no. 118)

Likewise, in week 5 when the dorian mode is introduced to the singing exercises, the canon set for study is written in the dorian mode (see Figure 3.5), and includes also an example of *musica ficta*.

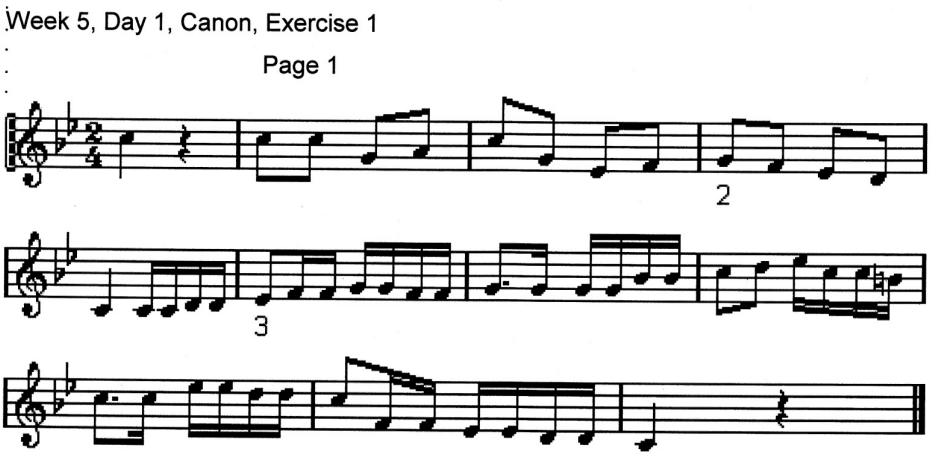


Figure 3.5. Canon in dorian mode (Molnár, no. 1)

3.8.6 Melodic Dictation

This element is not introduced until week 5 of the course. Its inclusion is delayed so that a basis for pitch work is first established through the singing and the interval exercises. This approach mirrors language acquisition and writing. Children learn to hear and reproduce language long before they write the sounds and words. This appears to be supported by Gordon (1971) when he writes: "Because music is an aural art, one must first acquire aural perception and kinaesthetic reaction in order to develop musical understanding in a conceptual sense. Even in regard to verbal association learning, Lowell Mason's pronouncement 'sound before sign' is as valid today as it was many years ago. That is, 'sound' must be taught before 'sign' can be given meaning."

The rhythm of each melody is provided to the student for weeks 5-9 so that students may focus exclusively on the pitch information. From week 10 they must discern the rhythm as well as the pitch. In *Music Craft 1* all melodies use treble clef, and are played six times with 30-second intervals between the playings. Students are encouraged to set a goal for each hearing, and to complete the rhythm first which can act as an *aide memoir* for the pitch. The first melodies are well known folk tunes, so that students begin with the familiar and move to

the less familiar as the semester progresses. Students are encouraged to be aware of the tonic and dominant notes and their functions, the unique rôle and character of each pitch in the designated key, as well as to listen for repeated material (eg direct repetition, sequence etc.). Students check their answers from an answer screen available from the CD-ROM. The majority of the melodies are in simple duple or simple quadruple metre and therefore reinforce concepts covered in rhythm work, although some are in compound duple metre. A sample melodic dictation, from week 11 of the course, may be seen in Appendix C.

3.9 Tuition Styles

Although the internal and external modes of *Music Craft 1* have the same content, it follows that the style of tuition will be different for each cohort.

3.9.1 External Mode

Externally enrolled students are provided with a package of materials. This package comprises the CD-ROM which contains the exercises, an Introductory Book in traditional print format which contains instructional materials, and an audio CD which contains the two assignments to be submitted at designated times during the semester. Table 3.5 shows the number of each type of exercise included on the CD-ROM for the 13 weeks of study for *Music Craft 1*.

Table 3.5

Music Craft 1: Semester exercise overview chart showing the number of exercises for each element

Week	Rhythmic Dictation	Pitch Recognition	Interval Recognition	Singing	Canon	Melodic Dictation
1	10	2	20	2	1	-
2	10	2	20	3	1	-
3	10	2	20	5	1	-
4	10	3	20	8	1	-
5	10	5	20	13	1	5
6	10	12	20	13	1	5
7	10	13	20	1	1	5
8	10	14	20	3	1	5
9	10	15	20	4	1	5
10	10	16	20	5	1	5
11	10	-	20	6	1	5
12	10	-	20	6	1	5
13	10	-	20	6	1	5

Students are able to navigate the CD-ROM in a variety of ways. One of the choices available is to click the button *Next Exercise*. When this button is used, a programmed sequence of exercises is followed so that some of each type of exercise is included in each day's work. For example, the sequence of exercises on Week 1, Day 1 is

RD1 → RD2 → PR1 → PR2 → IR1 → SG1 → SG2 → CN1 (→ Day 2).[7]

The sequence for Week 5, Day 1, in which melodic dictation is introduced and when the number of pitch recognition and singing exercises is increased, is

RD1 → RD2 → PR1 → PR2 → IR1 → SG1 → SG2 → SG3 → SG4 → SG5 → CN1 → MD1 (→ Day 2)

However, it may not suit the learning style of each student to adhere rigidly to the programmed sequence. Some students report that once they are "on a roll" they might, for example, complete a whole week's rhythm work in one session. Some students are visual learners and need to see the notation that represents what they hear to assist in the cognitive process. For this reason, students are encouraged in the Introductory Book to treat the CD-ROM flexibly to suit individual needs. The CD-ROM can be navigated flexibly by using the buttons allowing the student to choose a particular exercise on a particular day in a particular week. In rhythmic work, a visual learner might, for example, wish to view the answer screen before undertaking the dictation exercise in order to observe which rhythmic elements are utilised; or the student may play the rhythm on the computer or personally perform the rhythm whilst viewing the answer screen in order to internalise the rhythmic elements. The student may do this for several rhythms in a row, and come back to them after an appropriate interval of time to take them as dictation exercises.

In canon singing, a student may not yet feel sufficiently confident on Day 2 to attempt singing in canon against the given part (see section 3.9.5), but may prefer to use the exercise from Day 3 in order to have support in holding a vocal part against the other entry by singing *with* one of the computer-generated voice parts.

Alongside the possibility of flexibility to facilitate learning, however, comes the need for the student to be aware of the requirements for the assessments for which s/he cannot continue flexible processes.

[7] CN: canon; IR: interval recognition; MD: melodic dictation; PR: pitch recognition; SG: singing; RD: rhythmic dictation.

3.9.2 Internal Mode

Whilst the content and delivery might vary from time to time according to particularised requirements of a timetable or student cohort, a typical 60-minute lesson for internal students could be described as follows, each step taking between five and ten minutes

- Vocally and mentally warm up with scale/mode singing and interval exercises, checking for accuracy and intonation.

- Sing the canon for the relevant week, firstly in unison, with scale degree numbers. The starting note is selected by using interval work after hearing the tuning fork sounded. During the singing, check for accuracy of pitch and rhythm, and for tonal blend and correct vocal production. Aim for musical phrasing and dynamic shaping. Develop some memory work. Perform a harmonic analysis on the board (the separate parts are vertically aligned so that harmonic structures are more easily recognised). Proceed then to singing in parts in blocked groups – two groups, then three, then four if appropriate to the canon and if the students are sufficiently confident. Use different physical arrangements of the room, for example, standing in a circle around the room. Students can then perform in pairs numbered off around the circle. Select a small group to perform the canon. Select one or two students to conduct the class (check for consistency of pulse, accuracy of beat pattern, clarity of entries and cut-offs). Mindful of the findings of McCoy and Ellis (1992) concerning the beneficial effects of using large muscle movements to mark the beat groupings, internal USQ students are exposed to movement activities within their classes; for example, conducting the beat patterns whilst speaking the French time names is considered an important activity in promoting awareness of the rhythm in relation to the beat and in mental and physical co-ordination.

- Sight-read a melody from the board. Prepare for this by speaking the rhythm in French time names, noting the key, numbering the pitches according to scale degree, observing the form/structure (number of phrases, elements of repetition, etc.), observing the range, singing the relevant scale in appropriate range (this would be drawn on the board, and students would “follow the pointer” firstly with the scale, and then with the melodic content of the melody). Finally, read the melody from the notation on the board.

- Introduce the new rhythmic element(s) for the appropriate week. Clap one- or two-bar rhythms in which the new element has been incorporated, for the class to mimic. Introduce the French time name and explain the logic of the name. Write the rhythmic element on the board, into one or more two-bar rhythms using, for example, only the new element and crotchets. Have the class speak the rhythm in French time names, and have them clap the rhythm. Read an eight bar rhythm by speaking, clapping, conducting, tapping a crotchet pulse while speaking rhythm; speaking pulse while clapping rhythm; tapping the pulse with one hand whilst tapping the rhythm with the other hand, etc. Clap, for example, a two-bar rhythm for class to mimic using French time names. Proceed to one or two dictations (depending on available time). After checking the answer, have the class perform the rhythm(s) in a variety of ways as described above.

- Interval identification – in melodic and harmonic form – through use of association (e.g., with common melodies), scale degrees, etc. Some examples are given vocally, and some (especially in harmonic form) on the piano. Both ascending and descending intervals are used during the course of the semester.

- Melodic dictation, possibly by using the sight-reading example from earlier in the class. When complete, have the students sing it back, then check from the notation (which has been discreetly covered since the sight-reading activity described at the third bullet point above) on the board. Some examples are given vocally and some on the piano. Such a procedure is in line with ideas such as those advocated by Stowasser (1991).

3.10 Assessment

There are some differences in assessment between the internal and external modes, although these are kept as much as possible to a minimum.

3.10.1 External Mode

The external students complete three assessments in the semester, two assignments and one formal examination. The first assignment is due at the end of Week 6 and the second assignment at the end of Week 12. These are completed by the students without supervision

and submitted through the Distance Education Centre at USQ. Each assignment comprises four elements:

- a rhythmic dictation;
- a melodic dictation;
- scale/mode recognition;
- interval recognition.

The student scripts are completed on the question paper included in the Introductory Book, and the musical examples are given on an audio CD which is included with the external materials. The correct number of playing and timed intervals of silence between each playing and each question is included on the audio CD so that the students have no need to manipulate the CD player whilst completing the assignment. It is recognised that, because the assignment work is not supervised, there is no security that students will not replay any or all of the audio CD; however, with each assignment weighted at only 20% and the examination (which is invigilated by the University) weighted at 60%, the possibility of skewing results by repeated playings of the assignment material is minimised as far as possible.

The examination is held during the formal examination period and is therefore invigilated. Students are instructed to bring a portable CD player with fully charged batteries (in case there is no access to a power supply) and a set of headphones as well as their writing equipment. The students are supplied at the examination centre with the question paper on which they will write their answers, a sheet of blank manuscript paper for working purposes, and an audio CD which, like the assignments, gives the musical examples with the correct number of playing and timed intervals of silence between each playing and each question. The allocated time for the examination is the duration of the audio CD plus the University's stipulated requirement of ten minutes for perusal. Also like the assignments, the examination comprises

- a rhythmic dictation;
- a melodic dictation;
- scale/mode recognition;
- interval recognition.

Appendix D shows a sample (external) examination which can be compared with the aural audition test (Appendix E) and the pre-test/post-test (Appendix 6).

3.10.2 Internal Mode

Internal students have three assessments, two of which are written and one which is practical. The two written assessments are conducted as in-class tests, in Weeks 6 and 12, weighted at 30% each, and comprising five elements:

- a rhythmic dictation;
- a melodic dictation;
- scale/mode recognition;
- interval recognition;
- canon.

For the final question the students are required to complete the canon (selected from those studied in class each week) for which the incipit is given. With the exception of the final question for canon, the written tests for the internal students are identical in format to the two assignments and the end-semester examination for the external students.

The practical examination for internal students, weighted at 40%, consists of

- canon singing (one voice per part);
- singing of intervals, scales and modes.

This test takes place usually in Week 13 or, occasionally, during the formal examination period. From *Music Craft 2,* which falls outside the scope of the present study, the practical examination also incorporates performance of melody and of rhythm at sight.

This chapter has provided an overview of the six Music Craft courses to give a context for *Music Craft 1*, and the content and conduct of *Music Craft 1* has been described in some detail. Chapter 4 now describes the research method adopted for the study.

Chapter 4
Research Method

4.1 Selection of Subjects

In a study of two approaches to ear training for elementary school students, Deutsch (1971) used three groups – two experimental groups and one control group. The project which is the subject of this dissertation used a similar strategy.

The subjects were all enrolled students of the University of Southern Queensland in Toowoomba, Australia, in semester one of the 2002 Australian academic year. The subjects (N=45) were divided into three groups by enrolment type, designated as Groups A, B and C. Because of audition requirements to enter the Certificate or Degree programmes in which the subjects were enrolled (detailed in Chapter 3), it was assumed that the subjects in Groups A and B had a considerable amount of previous musical experience.

Group A (n=16) is the group which studied *Music Craft 1* externally during the period of the project. Most of the subjects in Group A were enrolled in the Certificate of Music Teaching programme. The group consisted of one male and 15 females with an age range from 20 to 57 years. The principal instruments identified are clarinet (1), guitar (1), piano (12), trumpet (1) and voice (1). The majority were studio music teachers who enrolled to improve their teaching skills and philosophies, or to gain an appropriate qualification. Many had been teaching their instrument in private studios for some time, but some of the younger subjects of this group were seeking to gain skills and qualifications that would give them greater confidence to begin or to expand their studios. Their musical experience was gained mostly from their instrumental study, which for the older subjects had been quite some years since. Most of these subjects had not studied Music as part of their secondary education because such study had not been available at that time.

Group B (n=17) is the group which studied *Music Craft 1* internally during the period of the project. They were studying towards either the Bachelor of Music, or the combined Bachelor of Music/Bachelor of Education degree, or were Bachelor of Arts students or students from other Faculties taking a Music option. The majority of subjects in Group B were school-leavers enrolled in the first year of the Bachelor of Music award program, although some had finished their secondary schooling one or two years earlier. The group consisted of eight males and nine females with an age range from 17 to 19 years. They exhibited a much greater variety of principal instruments, and were unlikely to have practised

studio teaching. Their musical experience had been gained mostly from their instrumental study and from studying Music as a subject for five years at secondary school. The principal instruments identified for this group are: clarinet (2), flute (1), guitar (1), percussion (1), piano (3), saxophone (2), trumpet (1), viola (1) and voice (5).

Geringer and Madsen (1996) confirmed and extended the findings of an earlier study (Madsen and Geringer, 1990) by showing that the listening patterns of musicians and nonmusicians are different; it was therefore necessary to select as the control group subjects who were, in effect, nonmusicians, but who had sufficient declared musical background to be able to complete the research test. Group C (n=12), therefore, is the control group which did not participate in any music training during the period of the project. Participants in Group C were enrolled in an expressive arts course in the Faculty of Education, training to become general primary school teachers. They had some declared musical background, the extent of which varied greatly. Some had experienced only classroom music, whereas others had received instrumental instruction, either privately or within the school system. The 12 subjects in this group were exclusively female with an age range from 18 to 33 years. Some were studying fresh from school and others were ready to embark on a teaching career as an alternative to or having completed early child rearing. The identified principal instruments for this group are flute (2), organ (1), piano (5) and trombone (1). Three elected not to identify an instrument. Group C subjects were not enrolled in *Music Craft 1* and were not taking any musical instruction for the duration of the research project.

4.2 Ethics Submission

The use of human subjects in the study required ethical clearance from both the University of Queensland, as the conferring institution, and the University of Southern Queensland, as the institution where the study was carried out. The submissions were lodged late in 2001 and approval to proceed was gained without impediment.

4.3 Informed Consent

It was a requirement that all subjects should read and sign an Informed Consent form (which may be seen at Appendix G). By signing the Informed Consent form, subjects affirmed they had read and understood the form. It was understood by the subjects that participation was voluntary, and that subjects could withdraw from the study at any time. During the course of the project there were some withdrawals: Group A commenced with 21

subjects completing the pre-test, but only 16 completed the post-test; Group B started with 22, concluding with 17 subjects; while Group C began with 14 subjects and finished with 12. Attrition in Groups A and B was the result of students withdrawing from enrolment in either the Music Craft course or from the entire degree or certificate programme, whereas in Group C it was from a lack of application. The results of subjects who withdrew were not included in the pre-test results even though they had completed the test; the results used were those of only the subjects who had completed both the pre-test and the post-test in order to give the best possible integrity to the results.

4.4 Development of the Survey and the Research Test

The survey (see Appendix H) was first developed in May 2001. Some changes were carried out in August 2001 following discussion with the supervisor. The majority of these changes were visual, experimenting with different fonts and arrangements on the page to optimise clarity and precision. The survey was then trialled by a choral class at the University of Queensland. The trial was administered by the supervisor[8] who videotaped the proceedings to verify that protocols were observed, and to ascertain how long it took for students to complete the survey and the test. These timings were later used in a Memorandum to those who administered the test for Group A subjects (see Appendix I). As a result of the trial, further refinements in layout were made to the survey in October 2001; the final version received a further modification to layout on 8 March 2002, immediately prior to the commencement of the study. Despite the careful preparation, an omission that had previously escaped notice was detected when collating the survey results: Question 3 did not provide for subjects from other degree programmes (e.g., Bachelor of Arts) who were enrolled in Music as an option. This affected only two subjects, both from Group A. One was a cross-institutional enrolment, and the other was a USQ Bachelor of Arts student.

The test (see Appendix F) had a similar gestation period to the survey. Visual clarity was considered to be very important, so that subjects were not unnecessarily distracted during administration of the test. A variety of formats and wordings was considered, and the test was trialled by the University of Queensland choral class at the same time as the survey.

The trial emphasised the importance of visual layout. The test paper had already been designed so that all responses could be provided on it, without needing recourse, for example, to manuscript paper for melodic work. A smaller point size was selected which then enabled

[8] At that time the supervisor was Dr Richard Swann.

each of the four questions to appear discretely on its own page. The pilot test did not give any indication of the ceiling effect which is reported in chapter 5, and it was not considered necessary as a result of the pilot test to revise any of the questions.

4.5 The Survey

The survey may be found at Appendix H.

Questions 6 and 7, relating to instruction received for one or more musical instruments were included, hopefully to show connections between the study of a certain instrument and aural ability or aural development. This could indicate an area for further research. Question 8, in which subjects are asked to rate themselves in a variety of areas of aural acuity, was included in order to evaluate any correlation between self-perception and actual ability. This was considered important as the last two areas in this self-rating exercise, that is, singing in tune and holding a vocal part, could not be tested in the research project but were considered to be important aspects of aural acuity. Music training builds on skills already acquired through enculturation (Sloboda, 1985), and Wittgenstein stated (in Aiello, 1994) that simplicity and familiarity can cause aspects of things that are most important for us to be hidden. On the basis of these and on the suggestion that lack of confidence in one's own ability may be a primary reason for erroneous response (Radocy, 1975), the researcher believed it would be of interest to ascertain whether trends in self-rating and test results could be observed.

4.6 The Research Test

Aural assessment undertaken by students at audition and during enrolment in *Music Craft 1* seeks to determine ability in similar or identical areas to the pre-test/post-test; however, there are some fundamental differences between the aural audition test and the research test. The audition test (see Appendix E) measures abilities which were contained in the BOSSS Senior Music Syllabus[9], and is part of a series of audition tests which determine the candidates' suitability for tertiary music study, not only in executant ability, but in the areas of aural perception, music theory and musical general knowledge (i.e., music history, signs and terms, form, etc.). Assessment during *Music Craft 1* comprises the same type of work as the pre-test/post-test, but is more closely aligned to the rate of development in the curriculum, especially as it relates to the rhythm and melody work. In these two areas in

[9] The Senior Music Syllabus has since been revised and no longer contains any aural work.

particular, the pre-test/post-test was designed to measure different facets of each skill; these are detailed in sections 4.6.1 to 4.6.4. A sample written exam from *Music Craft 1* is provided as Appendix D).

Two textual copies of the research test may be found at Appendix F, one which is blank (Appendix F1) and one with the target responses provided (Appendix F2). The test comprises four questions, designed to measure abilities in four areas of aural perception:

- rhythmic perception;
- melodic perception;
- scale and mode recognition;
- interval recognition.

4.6.1 Question 1

Question 1 is designed to measure ability in rhythmic perception. The question comprises three rhythmic dictations: the first one is simple and each succeeding dictation increases in complexity. Each bar of each rhythm has different rhythmic acuities which are assessed.

Each rhythm is four bars long, in 4/4 metre. The rhythm is played three times, with 30-second pauses between each playing. The rhythms are performed using a medium-pitched woodblock sound. Each playing is preceded by a complete bar of pulse (four crotchet clicks) to set the tempo (MM = 80), performed using a higher-pitched woodblock sound to allow subjects to differentiate easily between the two timbres. The final playing is followed by 60 seconds of silence which the participant may use to complete writing his/her response. Ten seconds' warning that the next part of the question was about to commence, was given.

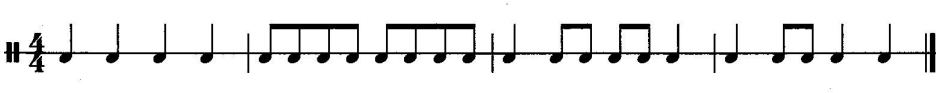


Figure 4.1. Rhythm dictation (a)

Rhythm dictation (a) utilizes only crotchets and quavers, that is, each crotchet unit is represented in the rhythm by either

- a single sound (crotchet);
- two sounds (a pair of quavers).

Thus, the question assesses whether the subject could discriminate beats with one note or beats with two notes (see Figure 4.1).

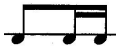
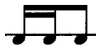
Rhythm dictation (b) (see Figure 4.2) utilizes crotchet units which are represented by any of the following

- a silence (crotchet rest);
- a single sound (crotchet);
- three sounds (a quaver and two semiquavers, or two semiquavers and a quaver);
- four sounds (four semiquavers).

Figure 4.2. Rhythm dictation (b)

The question assesses whether the subject could discriminate beats with no sound, beats with one note, or beats with more than one note. It also assesses whether the participant could accurately discriminate the subdivisions of the beat. The most complex of these choices was if the beat utilized three sounds, because the subject had then to decide which of two rhythms  or  was the correct one.

Rhythm dictation (c) is given at Figure 4.3. It is the most complex of the three rhythms and utilizes crotchet units which are represented by

- a single sound (crotchet);
- two sounds (two quavers, or a dotted quaver and a semiquaver, or a semiquaver and a dotted quaver);
- three sounds (a quaver and two semiquavers, or two semiquavers and a quaver, or semiquaver-quaver-semiquaver, or triplet quavers) -  or  or  .

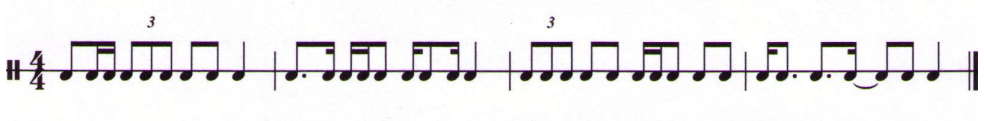


Figure 4.3. Rhythm dictation (c)

Thus, if there are two sounds in the beat, the participant must discriminate amongst three possibilities. If there are three sounds in the beat, the participant must discriminate amongst four possibilities. A further complexity is the use of a tie from the second to the third beats in bar 4. The question assesses whether the participant could discriminate beats with one note or beats with more than one note. It also assesses whether the participant could accurately discriminate the subdivisions of the beat.

4.6.2 Question 2

Question 2 is designed to measure ability in melodic perception. The question comprises three melodic dictations, the first one simple and each succeeding dictation increasing in complexity. Each melody is four bars long, in 4/4 metre. The rhythm for each melody is provided, so that the participant is required to reproduce only the pitch in the melody, assuming that the subjects would discriminate congruence/non-congruence of pitches in one-step tasks better than for two-step tasks (Sergeant & Boyle, 1980). There are no chromatic alterations to pitch, so participants are not required to consider modulations or other changes to tonality. Each bar has different pitch acuities which are tested. The melodies are played three times, using a piano timbre at a tempo of MM = 80, with 30-second pauses between each playing. The tonic chord in close position is sounded for the duration of a semibreve before each playing of the melody. The final playing is followed by 60 seconds of silence which the subject may use to complete writing his/her response. Ten seconds' warning was given that the next part of the question was about to commence.

The three melodic dictations assess whether the subjects can accurately discriminate the melodic contour in each bar, and whether the pitch is accurate. It is possible that the subject might write pitch which is partially or totally incorrect but which accurately follows the melodic contour.

Melodic dictation (a) is in C major, a traditionally "uncomplicated" key, and uses step-wise (scalic) motion throughout (see Figure 4.4). It will be observed that the first and third bars have a similar contour, but the pitches of each note are different.

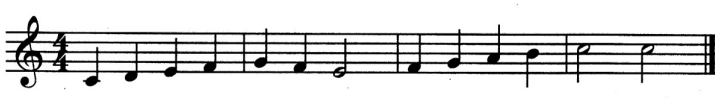


Figure 4.4. Melodic dictation (a)

Melodic dictation (b) is in the sharp key of D major, and makes much use of stepwise motion, and the overall contour represents, broadly speaking, an arch shape; but it is more complex with, for example, the undulations in the third and fourth bars (see Figure 4.5).

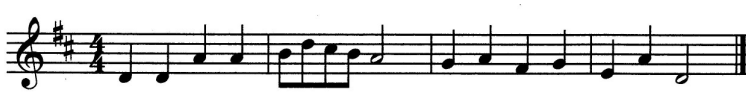


Figure 4.5. Melodic dictation (b)

The first bar uses only the intervals of the perfect unison and the perfect 5th, that is, the subject must determine whether the pitch is the same or whether it is higher. Furthermore, the subject must accurately determine the ascending leap of a fifth, to a note which is a part of the tonic chord, which is sounded before the playing of the melody.

In bar 2 the pitch rises a third to the upper tonic (part of the tonic chord which is sounded before the playing of the melody) before descending by step to the fifth degree, which the subject may recognize either as part of the tonic chord, as the dominant note (fifth degree), or as the same pitch as the end of bar 1. This aspect of recognition would be aided by the prominent position this particular pitch is ascribed in both bars, placed as they are on the third beat of the bar.

Bar 3 features a zig-zag contour followed in bar 4 by a standard melodic/harmonic progression, 2-5-1. The subject may recognize that this descending pattern is structured so that the first and third beats of these bars represent a descending stepwise movement, 4-3-2-1, with the intervening beats acting as embellishment to the overall stepwise melodic structure, or it may be perceived as a sequential pattern.

Melodic dictation (c) (see Figure 4.6) is in the flat key of F major. It is the most complex of the three melodies. Its M-shaped contour has the greatest variety (although Long [1977] found that M-shaped contours were easier to remember than V-shaped contours, it was conjectured that this may be because they require more attention to interval size); it has the most rhythmic movement; it commences on a note other than the tonic; it uses pitches on important beats of the bar (the first and third beats) in bars 2 and 3 which are not part of the tonic triad, so that there is a marked change in the way these pitches function in the melody which might be more challenging for the subject to identify.

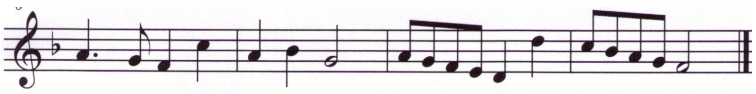


Figure 4.6. Melodic dictation (c)

The first pitch is the mediant, which it is possible for the subject to identify from the tonic chord sounded before each playing of the melody. Descending by step to the tonic and then ascending to the dominant, the tonic chord is clearly outlined.

In bar 2, a supertonic ending to the first phrase is encountered – the first time a pitch not derived from the tonic triad has been used in this position.

Bar 3 features an octave leap on the submediant. While the contour is lacking in complexity, the challenge lies in the different function of the pitches and the potentially surprising use of the octave.

Bar 4, by comparison, uses a similar contour in a more familiar context.

4.6.3 Question 3

Question 3 is designed to assess the ability to recognise scales and modes, that is, different regular patterns of tones and semitones. Subjects are asked to discriminate whether scale pairs or mode pairs are the same or different, and in addition, to identify the second scale or mode of the pair. The same piano timbre is used as for Question Two. The scales are performed at a tempo MM = 120 (i.e., each note in Figures 4.7 and 4.8 has a duration of four counts at MM = 120).

Question 3(a) is concerned with scales. Three pairs of ascending scales are presented, played twice each, with a 10-second pause between each pair. The starting note for all scales presented is middle C, and every scale finishes on C an octave above middle C. In each pair, the first scale is the major scale. Again drawing on the findings of Sergeant and Boyle (1980) reported in section 4.6.2, for each scale pair, the participant firstly is asked to state whether the scale pairs are the same or different by circling the appropriate response; the participant is then asked to state the name of the second scale in the space provided. If s/he does not know the technical name of the scale, the space is to be left blank; thus, the participant may be able to discriminate that the second scale is different, but may not be able to identify it accurately.

It will be seen from Figures 4.7 and 4.8 that all the modes and scales commence on middle C. In *Music Craft 1*, this is the practice in the early stages, although other transpositions are used later. Shatzkin (1984) found that the tonic hypothesis proposed in his study on interval recognition in minimal context was supported. For this research test, it was considered that having a common starting note would be less of a distraction to the subjects than using a variety of starting notes, so that the subjects could focus their concentration on the identification of the scale and mode patterns.

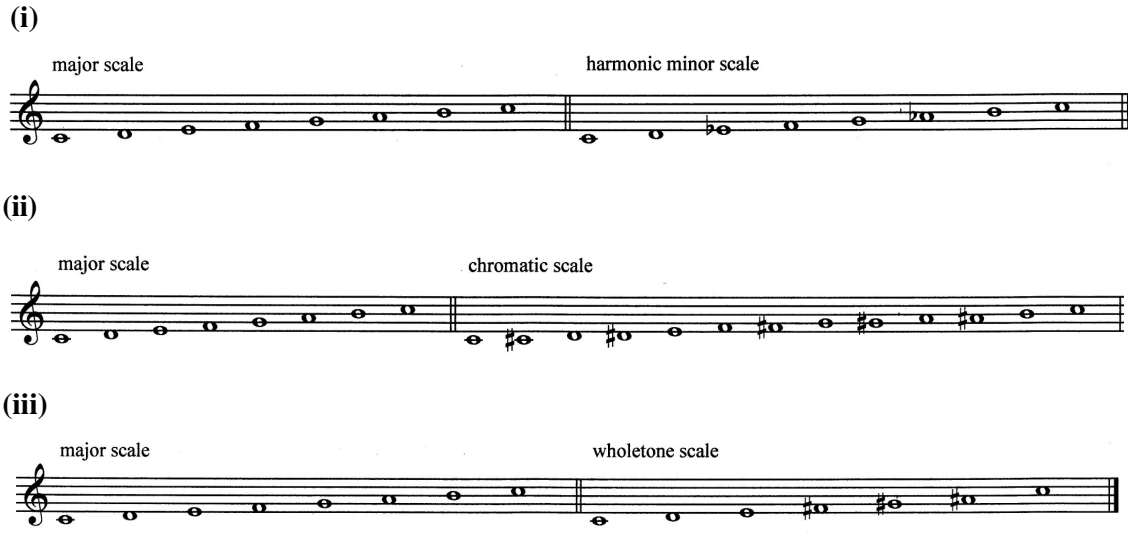
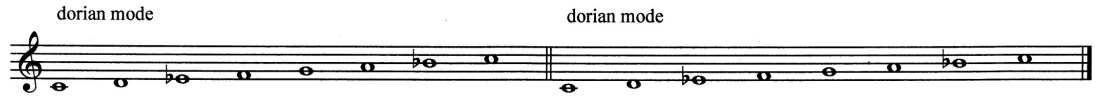


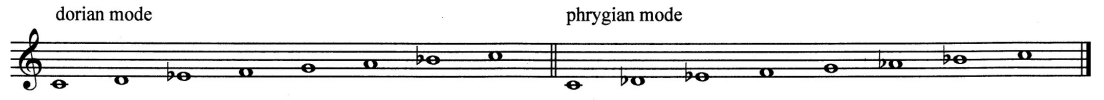
Figure 4.7. Scale pairs used in Question 3(a)

Question 3(b) is concerned with modes. Three pairs of ascending modes are presented in similar fashion to the scales in part (a). In each pair, the first mode is the dorian mode. For each mode pair, the subject is asked to state whether the mode pairs are the same or different by circling the appropriate response, and then to state the name of the second mode in the space provided. If the technical name of the mode is not known, the space is to be left blank. Again it is possible for subjects to discriminate that the second mode is different, but they may not be able to identify it accurately.

(i)



(ii)



(iii)

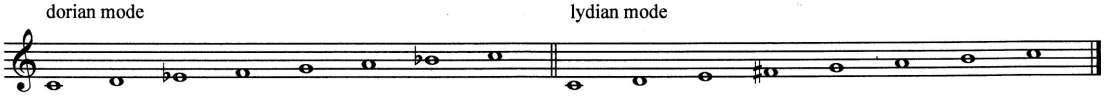


Figure 4.8. Mode pairs used for Question 3(b)

4.6.4 Question 4

Question 4 is designed to assess ability in interval recognition. Using a structure similar to Question 3, part (a) requires subjects to determine whether interval pairs are the same or different, and then to determine whether the second interval in each pair is wider than the first interval in the pair. Part (b) requires actual identification of the intervals that are played. The piano timbre is used again, at a tempo of MM = 240 (i.e., each note in Figure 4.9 has a duration of four counts at MM = 240).

Only ascending intervals are used in the research test, even though the course content including intervals in both ascending and descending forms. It was considered that, since ascending intervals are more difficult to judge accurately than descending intervals (Bentley, 1973; Radocy, 1978a) the use of only ascending intervals in the research test would be a better test of the effectiveness of the tuition.

In Question 4(a) three pairs of melodic intervals are presented, played twice each, with a 10-second pause between each pair of intervals. As shown in Figures 4.9 and 4.10, the lower note in all the intervals used commence on middle C. As for Question 3, this strategy is appropriate in consideration of Shatzkin's study (1984).

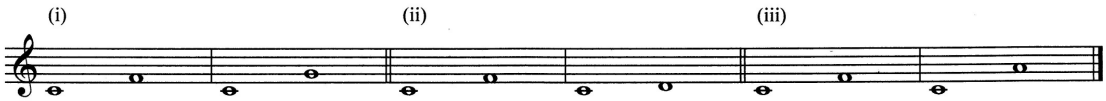


Figure 4.9. Intervals for Question 4(a)

It is explained to the subjects that a melodic interval is one note played after another. They are asked to state whether the interval pairs are the same or different by circling the appropriate response. If the second interval is different, the subject is asked to state whether it is wider than the first, by circling the appropriate response. All the intervals are presented in ascending form, and all commence on middle C.

In Question 4(b) five different melodic intervals are presented, played twice each, with a 10-second pause between each interval. All intervals are presented in ascending form, and all commence on middle C. The subjects are not told that all intervals will commence from the same pitch.

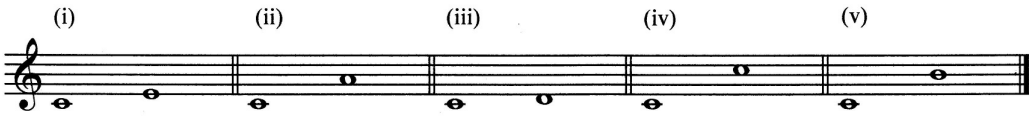


Figure 4.10. Intervals for Question 4(b)

Subjects were asked to identify the quality and the size of each interval. Three examples were given in parenthesis following this request – perfect 4th, major 6th, and minor 7th. Even though this cueing is given, only one of the example intervals named is an interval used in part (b), and two are not; subjects are therefore not advantaged by the examples given.

4.7 Equipment

Aural examples were prepared using a midi keyboard controller to Computer 1 that had Cubase VST Score 3.5 installed. This was connected to Computer 2 that had Gigasampler installed. Piano sampling (Gigasampler) was of a Yamaha D7. Audio recording was carried out through the Gigasampler sound capture facility. Audio files were edited and resampled to 22,050 Hz to enable all sound examples to be included on one CD (Sound Forge 4.0).

4.8 Test Administration

Some subjects were available on-campus for testing and others were not, by virtue of their external enrolment on account (in most cases) of their geographic distance from the University of Southern Queensland. This meant that the procedures for test administration could not be the same for all students. While this was not ideal for such a research project, it

was unavoidable; but steps were taken to make the procedures for on-campus and external subjects as consistent as possible.

The first of these steps was to provide an audio CD recording to be used for every administration of the test. The audio CD is included in Appendix F3. Using the audio CD meant that every participant in the study heard the same text and the same examples performed in exactly the same way in both the pre-test and the post-test.

4.8.1 Internal Subjects

The researcher was personally responsible for administering the pre-tests and post-tests conducted on-campus, so that conditions were identical for Group B and Group C subjects. For Group B, the tests were completed during a normally allocated aural class. For Group C, a separate time was negotiated when (i) all subjects were available, and (ii) the test venue was available. For all test sessions, once the audio CD was activated, the volume was monitored for the comfort of all subjects in the room during the introductory remarks; the test then proceeded without interruption.

4.8.2 External Subjects

To ensure as much as possible the integrity of the testing procedure, Group A (external) subjects were required via a memorandum (see Appendix J) to provide the researcher with the name and address of a suitable person to act as a supervisor for the test. The audio CD and papers for the test were sent by post to the nominated supervisor, along with a memorandum (see Appendix I) listing the contents of the envelope and instructions outlining how the test should be administered. Administration was expected to take a total of less than 50 minutes – two minutes to read and sign the Informed Consent form, five minutes to complete the survey, and 40 minutes to complete the test. A reply paid envelope was provided in which all contents (including the CD) should be returned to the researcher. A similar memorandum (see Appendix K) was posted with the test materials in June 2002 for conducting the post-test. Administration was slightly different from and expected to be shorter than for the pre-test because the survey did not need to be repeated. It was required that the test be conducted within a particular identified week at the commencement of the semester for the pre-test, and at the end of the semester for the post-test, to coincide as closely as possible with the administration of the research test to the on-campus subjects.

The pre-test was administered to Groups B and C on 13 March 2002, and to Group A on or as close as possible to 13 March 2002. Subjects in Groups B and C completed the post-test on 12 June 2002, the final week of the semester, and Group A subjects were asked to sit the test on or as close as possible to 19 June 2002.

4.9 Test Conditions

For Groups B and C, the test was administered both times in discrete groups, in a USQ lecture room which was airconditioned and had both fluorescent and natural lighting. The sound source for the test was an audio CD.

For Group A, a group administration of the test was not possible on account of the subjects living in widespread geographical locations around Australia. The physical conditions experienced by each subject in this group were therefore different. The method for ensuring as much consistency as possible in test administration has already been described in section 4.8.2.

4.10 Collation of Forms and Test Papers

Once the pre-tests were completed, a code was allocated to each subject's completed test paper. The code consisted of a letter and a number. Group A subjects were identified with the letter *A* and a number from 1 to 21 (i.e., A1, A2 etc.). Likewise, Group B subjects were identified as B1, B2 etc, and similarly for Group C. Each survey and each test was then identified with the appropriate code. Every page was identified in case staples or other fasteners failed and pages became separated. The cover pages which contained both the subject's name and the coded identifier were then stored in a physically separated and secure location so that the identity of the subjects would be protected.

The Informed Consent forms were separated from the surveys and checked that each had been signed by the subject and by the witness. The Informed Consent forms were not marked with the subjects' codes.

Since many of the subjects, especially those studying on-campus, were known to the researcher, and as a further step to preserve anonymity of the subjects, it was decided that the pre-tests would not be marked until after post-tests also had been completed, that is, the pre-test and the post-test were marked at the same time, after the coding process had been completed.

4.11 Marking of the Test

In order to appreciate how the raw data originated, the marking procedures and allocation of marks for each question are now described.

4.11.1 Question 1

Question 1 was allocated 20 marks. There were three rhythms, each four bars long in 4/4 time. Rhythm (a), being the simplest of the three, was allocated a value of four marks, and rhythms (b) and (c) were worth eight marks each.

Each crotchet beat was given a tick or a cross according to accuracy. Each beat was either correct or incorrect: no part marks were given. Subjects could receive a maximum of 16 ticks for each rhythm, that is, one tick per crotchet beat. The number of ticks earned determined the result. For rhythm (a) the number of ticks was divided by four to determine the mark out of four; for rhythms (b) and (c) the number of ticks was divided by two to determine the mark out of eight. The sum of the marks for each of the three rhythms gives a total result out of 20.

4.11.2 Question 2

Question 2 was allocated 20 marks. There were three melodies, each four bars long in 4/4 time. Melody (a), being the simplest of the three, was allocated four marks, and melodies (b) and (c) were allocated eight marks each.

For this question, each bar (as distinct from each crotchet beat as in Question 1) was allocated a tick, and therefore one mark, if completely correct.

The next step in marking the melodies was to identify the incorrect pitches. This was done by writing a note head in red ink at the correct pitch, in the place of each note the subject identified incorrectly (see Figure 4.11 for an example). This allowed the researcher to observe clearly whether the subject had identified the contour accurately, even though the pitches were incorrect. If this was the case, then half a mark was awarded to the bar, as shown in bars 1 and 2 in Figure 4.11. Incorrect pitch coupled with an incorrect contour resulted in a zero mark for the bar.

If an individual crotchet or quaver pitch was incorrect, one quarter of a mark was deducted from the bar, that is, a single incorrect pitch resulted in ¾ of a mark being allocated, as in bar 3 of Figure 4.11. If only a single crotchet beat was correct – a very infrequent occurrence – then ¼ of a mark was awarded.

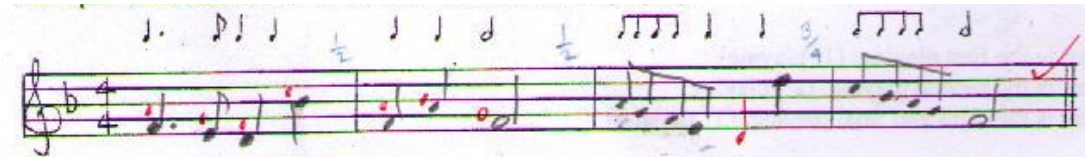


Figure 4.11. Example of marking for Question 2(c)

To calculate the result for each melody, the number of ticks and any part marks awarded were added together. For melody (a), this gave the result out of four; for melodies (b) and (c) the figure was multiplied by two to arrive at a mark out of eight. The sum of the marks for each of the three melodies gives a total result out of 20.

4.11.3 Question 3

Question 3 had a total allocation of 12 marks, parts (a) and (b) each valued at six marks. For part (a), the subject was required to indicate whether the scale pair that was heard was the same or different. There were three scale pairs, and the response received either a tick or a cross. The subject also was required to name the second scale in each pair; these three responses likewise were either ticked or crossed. Thus part (a) required six responses, each worth one mark. Part (b), dealing with mode pairs, was marked similarly. The sum of the separate marks for each part gave a total result out of 12 for the question.

4.11.4 Question 4

Question 4 was marked out of eight – that is, three for part (a) and five for part (b). In part (a) the subject was required to identify whether each of three interval pairs was the same or different and received either a tick or a cross for each. The subject was additionally required to state whether the second interval of each pair was wider than the first, each response allocated either a tick or a cross. Thus six responses were required for part (a), and each tick was worth ½ a mark.

In part (b), subjects were asked to name the five different intervals heard, giving both quality and size for each interval. In this way, 10 pieces of information are requested, each worth ½ a mark.

Chapter 5 presents the results of the completed student scripts for the questions described in chapter 4, and also for the subjects' self-ratings in the areas of rhythmic perception, melodic perception, scale/mode recognition, interval recognition, and for singing in tune and holding a vocal part. Discussion of the results is given in chapter 6.

Chapter 5

Results

The first part of the study sought to ascertain associations between demographic information and performance in the pre-test/post-test. The SPSS[10] package was used for statistical analysis. Statistician Dr Ashley Plank analysed the output of the SPSS tests used and provided the researcher with raw data resulting from his analysis. The term *significant* in this chapter is used in the statistical sense of the word, to protect against false negatives In view of the considerable number of extant inferences, by default only effects significant at the 1% level are reported. However, if there is prior expectation of an effect the 5% threshold is used. Of course, there are likely to be many effects which remain undetected because of this default, especially given the relatively small sample sizes involved.

5.1 Demographic Data

Associations between variables from the demographic survey and measures from the pre-test/post-test were examined, and are categorised below according to the variables from the demographic survey. Nonparametric tests including Spearman's rank correlation and the Mann-Whitney statistic are used because of the ordinal nature of the measurement scales. The small sample size compromises ability to detect systematic trends, and since any trends are expected to be relatively small, few were found. Those detected should be viewed with caution because of the elevated probability of false positives caused by multiple testing.

5.1.1 Age

The narrow age range (17 to 19 years) in the Group B (Internal) causes difficulty in detection of age-related effects with this group, and little evidence of associations is found for Groups A (External) and C (Control). For Group A, there is evidence ($r_s = -.7$, $p < 0.01$) of a negative association between age and improvement in melodic dictation (see Figure 5.1). The scatter plot places each subject of the study on an xy axis. The subjects are plotted using symbols: *x* for external, *o* for internal, and ◁ for the control group. The vertical axis indicates the difference in test result (post-pre) for each subject. Those subjects plotted above the zero line improved from pre-test to post-test and those subjects plotted below the zero line scored lower in the post-test.

[10] *SPSS for Windows, Rel.13.0* (2004). Chicago, SPSS Inc.

5.1.2 Gender

Group A (n=16, external) comprised one male and 15 females, Group B (n=17, internal) was made up of eight males and nine females, while Group C (n=12, control) consisted entirely of females. The predominance of females in all three groups prevents comparisons for Groups A and C, and no significant gender differences on pre- or post-test results are detected for Group B.

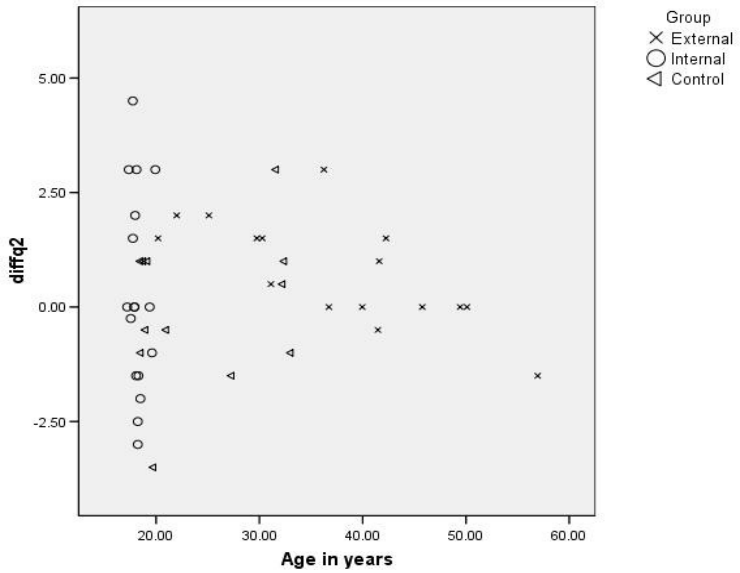


Figure 5.1. Group A: Age and improvement in melodic perception

5.1.3 Hearing Condition

Only three subjects (A9, A18, and C8) reported a hearing condition, all three indicating the condition was permanent. Whilst not required by the survey to describe the nature of the hearing condition, A9 volunteered the information that s/he suffered from mild tinnitus. At the time of the pre-test the ages of these subjects were 31, 57 and 33 years old respectively. The two subjects from Group A were both pianists whilst the Group C subject did not declare an instrument.

Insufficient information exists to determine any associations for this variable. Table 5.1 shows the pre-test and post-test performances of A9, A18 and C8. In this table the following abbreviations are used

- Diff Difference
- RD Rhythmic dictation
- MD Melodic dictation
- S/M Scale/Mode recognition

- IR Interval recognition
- SiT Singing in tune
- HVP Holding a vocal part.

It will be observed that the two subjects from Group A made an improvement or maintained their achievement levels in most skill areas, but that C8 was less successful. It is furthermore interesting to note from their self-ratings that A9 and A18 also judged themselves to have improved.

Table 5.1

Pre-test and post-test comparison for subjects A9, A18 and C8

Question		A9			A18			C8		
		Pre-test	Post-test	Diff	Pre-test	Post-test	Diff	Pre-test	Post-test	Diff
1 (RD)	(a)	4.0/4.0	4.0/4/0	= 0.0	4.0/4.0	4.0/4.0	= 0.0	4.0/4.0	4.0/4.0	= 0.0
	(b)	8.0/8.0	7.5/8.0	- 0.5	5.5/8.0	6.5/8.0	+ 1.0	6.5/8.0	5.5/8.0	- 1.0
	(c)	1.5/8.0	7.0/8.0	+ 5.5	2.5/8.0	4.0/8.0	+1.5	0.5/8.0	1.5/8.0	+ 1.0
	Total	13.5/20.0	18.5/20.0	+ 5.0	12.0/20.0	14.5/20.0	+2.5	11.0/20.0	11.0/20.0	= 0.0
2 (MD)	(a)	4.0/4.0	4.0/4.0	= 0.0	4.0/4.0	4.0/4.0	= 0.0	2.5/4.0	4.0/4.0	+ 1.5
	(b)	4.5/8.0	5.5/8.0	+ 1.0	7.0/8.0	5.0/8.0	- 2.0	4.0/8.0	3.5/8.0	- 0.5
	(c)	4.5/8.0	5.0/8.0	+ 0.5	5.5/8.0	6.0/8.0	+ 0.5	4.0/8.0	4.0/8.0	= 0.0
	Total	13.0/20.0	14.5/20.0	+ 1.5	16.5/20.0	15.0/20.0	-1.5	10.5/20.0	11.5/20.0	+ 1.0
3 (S/M)	(a)	4.0/6.0	4.0/6.0	= 0.0	2.0/6.0	6.0/6.0	+ 4.0	3.0/6.0	3.0/6.0	= 0.0
	(b)	5.0/6.0	6.0/6.0	+ 1.0	2.0/6.0	6.0/6.0	+ 4.0	4.0/6.0	4.0/6.0	= 0.0
	Total	9.0/12.0	10.0/12.0	+ 1.0	4.0/12.0	12.0/12.0	+ 8.0	7.0/12.0	7.0/12.0	= 0.0
4 (IR)	(a)	3.0/3.0	3.0/3.0	= 0.0	3.0/3.0	3.0/3.0	= 0.0	3.0/3.0	2.5/3.0	- 0.5
	(b)	5.0/5.0	5.0/5.0	= 0.0	3.5/5.0	2.0/5.0	-1.5	1.5/5.0	1.0/5.0	- 0.5
	Total	8.0/8.0	8.0/8.0	= 0.0	6.5/8.0	5.0/8.0	-1.5	4.5/8.0	3.5/8.0	- 1.0
Self Rating	RD	Good	Good	= 0.0	Poor	Fair	+ 1.0	Good	Fair	- 1.0
	MD	Poor	Very poor	- 1.0	Poor	Fair	+ 1.0	Poor	Fair	+ 1.0
	IR	Fair	Very good	+ 2.0	Fair	Fair	= 0.0	Poor	Very poor	- 1.0
	S/M	Fair	Very good	+ 2.0	Fair	Good	+ 1.0	Very poor	Very poor	= 0.0
	SiT	Fair	Good	+ 1.0	Fair	Good	+ 1.0	Very poor	Fair	+ 1.0
	HVP	Poor	Fair	+ 1.0	Fair	Good	+ 1.0	Fair	Fair	= 0.0

5.1.4 Principal Instrument

A significant difference exists only in the following cases between subjects with piano as the principal instrument and subjects with piano as a secondary instrument. Group A, being the external group enrolled in a programme devised principally for pianists, comprised 12 pianists and four non-pianists; Group B, being the internal group, naturally included a greater range of instruments and comprised three pianists and 14 non-pianists; in Group C five subjects declared themselves as pianists, and seven as non-pianists. One of these non-pianists in Group C listed organ as the principal instrument, which, while not strictly the same as the piano, is a keyboard instrument.

The pre-test melodic dictation score (Question 2) is significantly higher on average for pianists than for non-pianists ($U = 1.5$, $p < 0.01$). Likewise, the pre-test total scores (i.e., the sum of the separate scores for Questions 1-4) is significantly higher on average for pianists than non-pianists ($U = 1.0$, $p = <0.01$), and the improvement in the self-rating score is significantly higher on average for pianists than for non-pianists ($U = 2.5$, $p = 0.01$).

For Group B, quite strong associations were detected, as indicated in Figures 5.2 and 5.3. Both graphs show the pianists as scoring higher than the non-pianists.

On the graphs following, one circle represents one subject. The circles placed to the right along the horizontal axis represent those subjects for whom piano is their principal instrument, whereas the circles placed to the left represent those whose principal instrument is something other than piano. In Figure 5.2, the vertical axis provides measurements for *diffq8*, which show whether subject's self-rating was higher or lower in the post-test (i.e., the difference in self-rating from pre-test to post-test). Question 8 in the survey was the question in which students rated their performance for several aural acuities on a five point Likert scale. Self-rating in relation to this graph applies to the combined self-ratings for rhythm dictation, melody dictation, scale/mode recognition, interval recognition (i.e., the four acuities measured by the test) as well as for singing in tune and holding a vocal part (acuities not measured by the test). Where more than one subject achieves the same measure, the circles are superimposed, resulting in a darker visual representation for that score (e.g., -3.0 and 0.0).

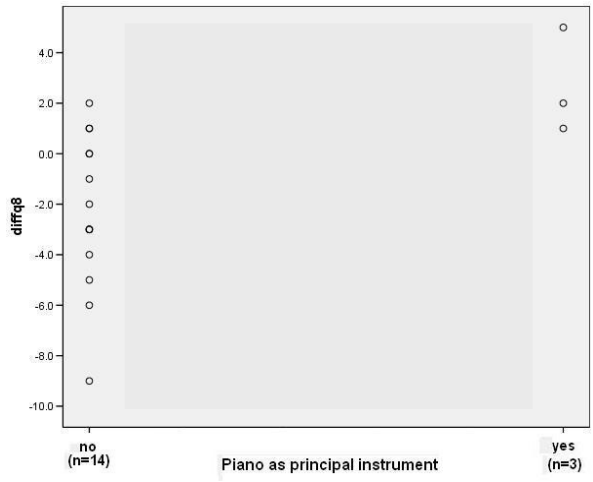


Figure 5.2. Group B: Piano as principal instrument and self-rating

In Figure 5.3 the vertical axis measures *sumq2pre*, that is, the total score for Question 2 for the pre-test.

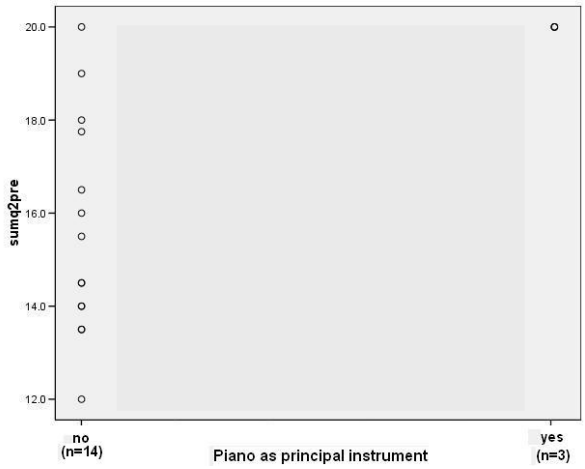


Figure 5.3. Group B: Piano as principal instrument and melodic perception

5.1.5 Length of Instruction

No significant associations were detected for any of the three groups, that is, students' results in the pre-test and post-test were not associated with the length of time students in the study had learnt musical instruments before beginning the aural training programme.

5.1.6 Formal Examinations Completed

No significant associations exist between whether formal examinations have been completed on the principal instrument for any of the three groups, that is, students' results in the pre-test and post-test were not associated with whether the students had completed examinations on their principal instrument before beginning the aural training programme.

5.1.7 Standard Achieved on the Principal Instrument

Correlations between the standard achieved on the principal instrument and pre-test scores were found to be positive; nevertheless, none was statistically significant. Likewise, the difference measures between pre-test and post-test were not statistically significantly associated with standard achieved.

5.1.8 Second Instrument

Testing associations regarding secondary instruments was not conducted on account of the lack of associations involving the principal instrument. Nevertheless, associations with the *number* of instruments played have some interest. Table 5.2 shows the distribution across the groups.

Table 5.2

Number of instruments played: Distribution by group

		External (Group A)	Internal (Group B)	Control (Group C)	Total
No of instruments played	0	0	0	3	3
	1	7	4	2	13
	2	9	13	7	29
Total	-	16	17	12	45

In Group A, as indicated in Figure 5.4, those playing two or more instruments experienced on average a significant improvement in scale/mode recognition above those playing one instrument only ($r_s = 0.6$, $p = 0.01$). In Group B no significant effects were detected.

In Group C there is a highly significant positive association between the number of instruments played and the pre-test self-rating score ($r_s = 0.8$, $p = 0.001$). This group also displayed a significant positive association between the number of instruments played and the pre-test score for Question 3(a) ($r_s = 0.6$, $p = 0.05$), shown in Figure 5.5, and on the total score of Questions 1-4 ($r_s = 0.6$, $p = 0.05$), shown in Figure 5.6. No significant effects were detected in Group A or Group B.

5.2 Inferential Analysis of Differences by Group: Analytical Procedure

For those measures involving a sum of scores from individual items (i.e., Questions 1-4, 1, 2, 3, 3(a), 4 and 8) an analysis of covariance was carried out on the post-test scores across the three groups allowing for differences in the pre-test scores. Where significant differences amongst the groups at the 5% level were detected, contrasts of the external and internal groups with the control groups were assessed. These effects were also tested non-parametrically using the Kruskall-Wallis and Mann-Whitney tests to protect against failure of assumptions in the parametric analyses.

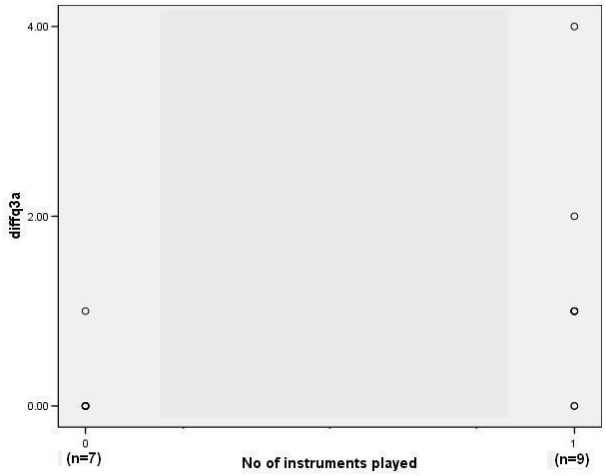


Figure 5.4. Group A: Number of instruments played and scale/mode recognition

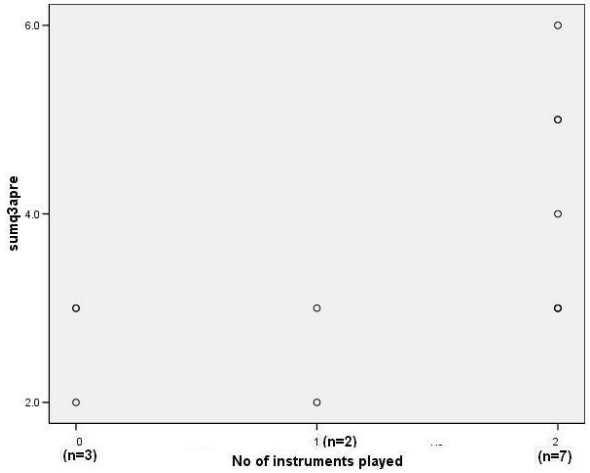


Figure 5.5. Group C: Number of instruments played and scale/mode recognition

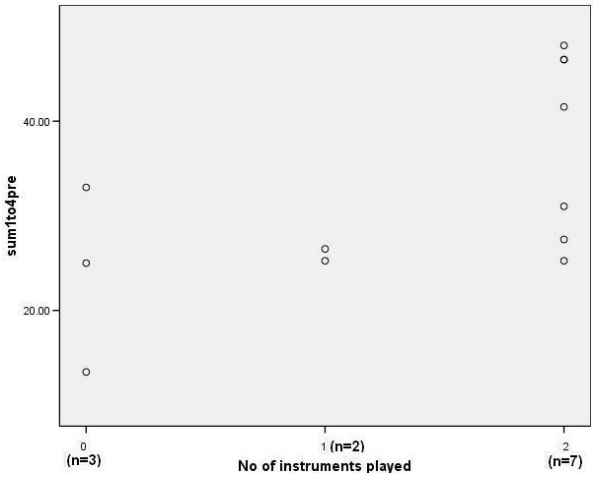


Figure 5.6. Group C: Number of instruments played and total test score

Relatively small numbers in each group mitigate against detecting small systematic effects. It is consequently inappropriate to comment, albeit with caution, where an anticipated trend is apparent when that effect is not statistically significant. Further, a ceiling effect is apparent for some measures – individuals with high pre-test scores are restricted in scope for improvement relative to individuals with lower pre-test scores. The ceiling effect is exposed by the bunching of points in the top right-hand corner and the funneling of trend lines into this corner on the scatterplots of post- versus pre-test scores (e.g., Figure 5.8). A transformation allowing for this skewness was considered but did not justify the extra complication in analysis and interpretation. However, an interaction term between group and pre-test scores in the analysis of co-variance to allow for this ceiling effect was included when significant in the analysis of co-variance.

A brief summary of the results of each analysis is reported for each measure. Note that two-sided p-values are reported. A chi-square statistic is reported for the Kruskall-Wallace test and a Z statistic for the Mann-Whitney test.

5.3 Results: Questions 1-4

Table 5.3 and Figure 5.7 indicate that all three groups improved their performance across the test as a whole, including the control group. Group A as a total commenced at a lower level and finished at a higher level than Group B. It will also be noted that the positive difference for Group C is not as great as the positive differences achieved by Groups A and B, and that the level of achievement for Group C falls well below those for Groups A and B.

Table 5.3

Questions 1-4 total: Change pre-test to post-test by group showing means

	Group A			Group B			Group C		
	Pre-test[1]	Post-test[1]	Difference	Pre-test[1]	Post-test[1]	Difference	Pre-test[1]	Post-test[1]	Difference
Means	46.98	54.07	+7.09	48.3	52.76	+4.46	32.45	33.91	+1.46
Means (%)	78.30	90.11	+11.81	80.50	87.93	+7.43	54.08	56.51	+2.43

[1] maximum = 60

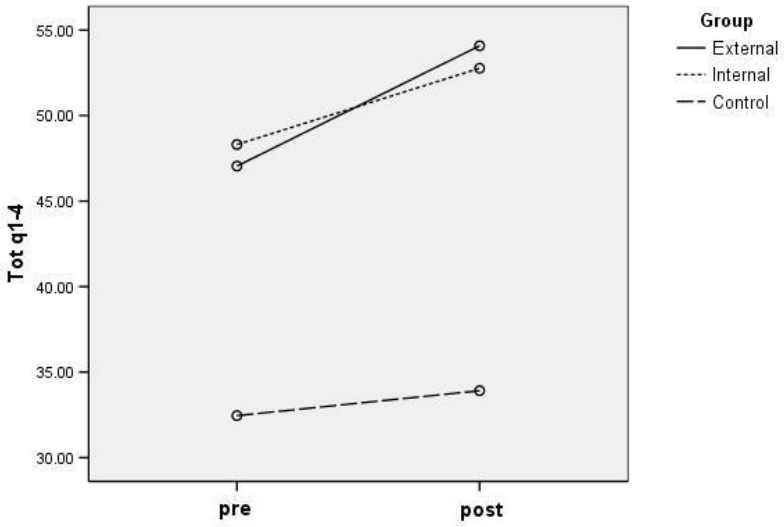


Figure 5.7. Questions 1-4 total: Change pre-test to post-test by group

Group A (External)

Confirming evidence is provided in Figure 5.8[11] giving the overall pre-test/post-test performance for Group A, in which a positive difference is indicated for all individual subjects in the group. This is indicated also in Table 5.4, in which the five most dramatic improvements (A1, 6, 7, 12 and 19) are shown in brown.

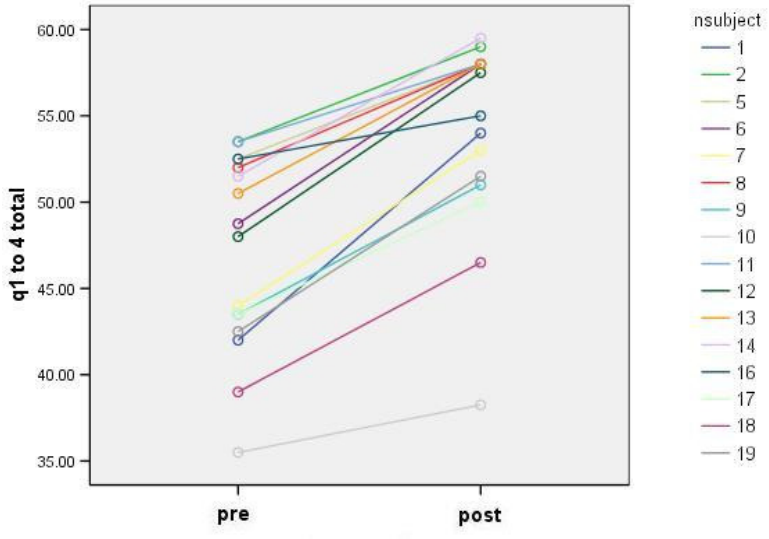


Figure 5.8. Questions 1-4 total: Change pre-test to post-test by individual for Group A

[11] It is acknowledged that the colour in this and other similar figures is not always sufficiently clear to distinguish every subject, but the figures nevertheless give a clear visual overview of illustrated trends.

Table 5.4

Questions 1-4 total: Change pre-test to post-test by individual for Group A

Subject (n=16)	Pre-test[1]	Post-test[1]	Difference
1	42.00	54.00	+12.00
2	53.50	59.00	+5.50
5	51.50	58.00	+6.50
6	48.75	58.00	+9.25
7	44.00	53.00	+9.00
8	52.00	58.00	+6.00
9	43.50	51.00	+7.50
10	35.50	38.25	+2.75
11	53.50	58.00	+4.50
12	48.00	57.50	+9.50
13	50.50	58.00	+7.50
14	51.50	59.50	+8.00
16	52.50	55.00	+2.50
17	43.50	50.00	+6.50
18	39.00	46.50	+7.50
19	42.50	51.50	+9.40
Mean	**46.98**	**54.07**	**+7.09**

[1] maximum = 60

Group B (Internal)

Figure 5.9, showing the results for Group B, indicates that all individual subjects except one showed a positive difference, albeit less dramatic, than for Group A. Table 5.5 shows this in more detail. The single exception is B17 who registered an insignificant negative difference (-0.50). The two subjects (B5 and B12) who achieved an improvement of a similar amplitude to those in Group A are shown in brown in Table 5.7. Individual scores are discussed later in greater detail.

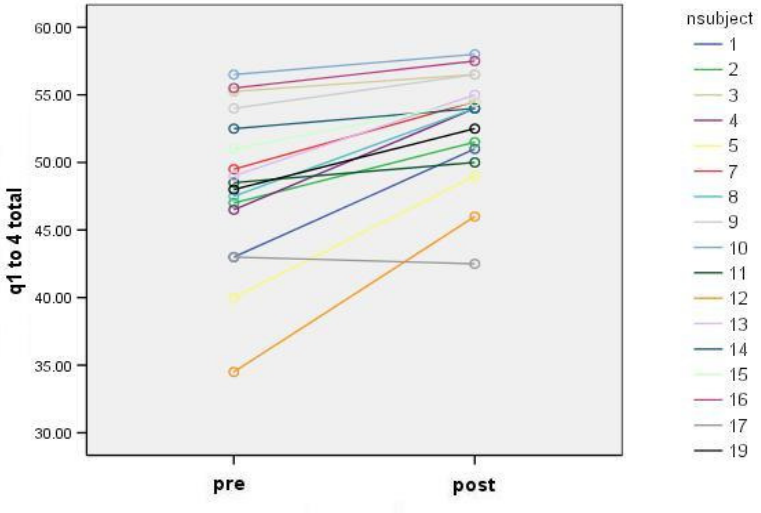


Figure 5.9. Questions 1-4 total: Change pre-test to post-test by individual for Group B

Table 5.5

Questions 1-4 total: Change pre-test to post-test by individual for Group B

Subject (n=17)	Pre-test[1]	Post-test[1]	Difference
1	43.00	51.00	+8.00
2	47.00	51.50	+4.50
3	55.25	56.50	+1.25
4	46.50	54.00	+7.50
5	40.00	49.00	+9.00
7	49.50	54.50	+5.00
8	47.50	54.00	+6.50
9	54.00	56.50	+2.50
10	56.50	58.00	+1.50
11	48.50	50.00	+1.50
12	34.40	46.00	+11.6
13	49.00	55.00	+6.00
14	52.50	54.00	+1.50
15	51.00	54.50	+3.50
16	55.50	57.50	+2.00
17	43.00	42.50	-0.50
19	48.00	52.50	+4.50
Mean	**48.30**	**52.76**	**+4.46**

[1] maximum = 60

Group C (Control)

Figure 5.10 shows a roughly even mixture of positive and negative differences for Group C, the differences in either direction being generally quite small, and one subject achieved the same score in both pre-test and post-test. Further detail is given in Table 5.6. The two most obvious results are those for C4 with a difference of -5.25, and for C14 with a difference of +6.50. C14 is followed closely by C9 (+4.75), C11 (+4.50) and C6 (+4.00). Although these subjects achieved positive differences, the scores still remain low.

C14 was a pianist who had had 8 years' tuition and had successfully attained AMEB Grade 7 two years prior to the project. This was the highest qualification gained in Group C, but the standard of the qualification does not appear to have been a contributing factor to success in the test when the results for C14 are compared to those for C9 and C6 (see Table 5.8): C9 had studied flute for two years and completed no formal qualification, C11 was a trombonist of six years' training with a Grade 6 qualification, and C6 had attained Grade 3 flute with two years' tuition.

Table 5.6

Questions 1-4 total: Change pre-test to post-test by individual for Group C

Subject (n=12)	Pre-test[1]	Post-test[1]	Difference
1	46.50	46.00	-0.50
2	41.50	42.00	+0.50
3	27.50	28.50	+1.00
4	25.00	19.75	-5.25
5	25.25	23.25	-2.00
6	48.00	52.00	+4.00
7	13.50	16.25	+2.75
8	33.00	33.00	=0.00
9	25.25	30.00	+4.75
11	46.50	51.00	+4.50
13	26.50	27.75	+1.25
14	31.00	37.50	+6.50
Mean	**32.45**	**33.91**	**+1.46**

[1] maximum = 60

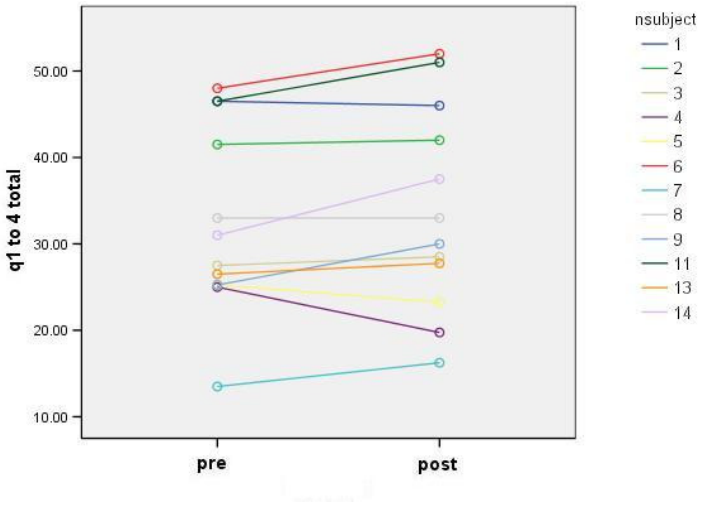


Figure 5.10. Questions 1-4 total: Change pre-test to post-test by individual for Group C

5.3.1 Results: Question One

Each part of Question 1 is now investigated in turn, examined group by group within each question. Tables 5.7 – 5.9 give the raw scores for the three groups for all parts of Question 1. The blank cells marked "not applicable" in these and further tables indicate subjects who commenced but did not complete the project, and whose results (if any) are

therefore not applicable to the final outcome. The correct answers for each question can be found in Appendix 6.

Responses for rhythm (b) exhibited a similar trend to those for rhythm (a), but were more marked. Group B scored best in both the pre-test and post-test, followed closely by Group A, while Group C gave the weakest performance.

In Group B, the pre-test result for rhythm (b) was stronger than for Group A, but the level of improvement was not as strong as for Group A. Only one maximum result was achieved in the post-test, by B4.

Group C registered a marginal decrease overall. Four subjects showed an increase in performance, three showed no difference, and five subjects performed more poorly in the post-test.

Table 5.7

Question 1(a): Raw scores for all groups

Subject	Group A (n=16)		Group B (n=17)		Group C (n=12)	
	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]
1	4.00	4.00	4.00	4.00	4.00	4.00
2	4.00	4.00	4.00	4.00	4.00	4.00
3	not applicable		4.00	4.00	4.00	4.00
4	not applicable		4.00	4.00	3.50	3.75
5	4.00	4.00	3.00	4.00	1.75	2.75
6	3.75	4.00	not applicable		4.00	4.00
7	4.00	4.00	4.00	4.00	0.00	1.25
8	4.00	4.00	4.00	4.00	4.00	4.00
9	4.00	4.00	4.00	4.00	3.75	2.50
10	3.50	3.75	4.00	4.00	not applicable	
11	4.00	4.00	4.00	4.00	4.00	4.00
12	4.00	4.00	4.00	4.00	not applicable	
13	4.00	4.00	4.00	4.00	2.50	3.25
14	4.00	4.00	4.00	4.00	4.00	4.00
15	not applicable		4.00	4.00	not applicable	
16	4.00	4.00	4.00	4.00	not applicable	
17	4.00	4.00	4.00	4.00	not applicable	
18	4.00	4.00	not applicable		not applicable	
19	4.00	4.00	4.00	4.00	not applicable	
Mean	**3.95**	**3.98**	**3.94**	**4.00**	**3.29**	**3.45**

[1] maximum = 4.00

Table 5.8
Question 1(b): Raw scores for all groups

Subject	Group A (n=16)		Group B (n=17)		Group C (n=12)	
	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]
1	5.00	8.00	6.50	8.00	6.50	6.00
2	8.00	8.00	7.00	8.00	5.00	4.50
3	not applicable		8.00	8.00	3.50	6.00
4	not applicable		8.00	8.00	3.50	3.00
5	8.00	8.00	6.00	8.00	4.00	5.00
6	5.00	8.00	not applicable		8.00	8.00
7	6.00	6.50	8.00	8.00	0.00	2.50
8	8.00	8.00	6.00	8.00	6.50	5.50
9	8.00	7.50	8.00	7.50	1.00	3.50
10	3.00	3.00	8.00	8.00	not applicable	
11	8.00	8.00	8.00	8.00	5.50	8.00
12	5.50	6.50	5.50	7.00	not applicable	
13	5.00	8.00	8.00	8.00	2.00	3.00
14	8.00	8.00	8.00	8.00	5.00	5.50
15	not applicable		6.50	8.00	not applicable	
16	8.00	8.00	8.00	8.00	not applicable	
17	6.00	7.00	8.00	6.00	not applicable	
18	5.50	6.50	not applicable		not applicable	
19	7.00	8.00	8.00	8.00	not applicable	
Mean	**6.50**	**6.81**	**7.38**	**7.79**	**4.20**	**5.04**

[1] maximum = 8.00

Table 5.9
Question 1(c): Raw scores for all groups

Subject	Group A (n=16)		Group B (n=17)		Group C (n=12)	
	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]
1	3.50	6.50	1.50	3.00	3.00	3.50
2	2.50	7.00	6.50	7.50	2.50	0.50
3	not applicable		6.50	7.50	2.00	1.50
4	not applicable		7.50	8.00	1.50	1.50
5	3.50	7.00	2.00	4.50	1.50	1.00
6	1.00	6.00	not applicable		4.50	6.00
7	1.00	4.00	5.00	6.50	0.00	0.00
8	1.00	6.00	4.00	6.50	0.50	1.50
9	1.50	7.00	7.00	6.00	1.50	1.00
10	2.50	1.50	4.50	6.00	not applicable	
11	4.00	6.00	6.50	7.00	1.50	2.50
12	2.50	7.00	1.50	4.00	not applicable	
13	3.50	6.50	5.50	7.50	0.00	0.00
14	1.50	7.50	4.50	5.00	2.00	1.00
15	not applicable		5.50	6.00	not applicable	
16	4.00	6.00	6.50	6.50	not applicable	
17	1.50	5.50	4.00	5.00	not applicable	
18	2.50	4.00	not applicable		not applicable	
19	1.50	7.00	3.50	5.00	not applicable	
Mean	**2.34**	**5.90**	**4.82**	**5.97**	**1.96**	**1.66**

[1] maximum = 8.00

The results of each group are now discussed in relation to individual scores for each part of Question 1.

5.3.1.1 Question One Total: Group A

Figure 5.11 indicates that all three groups registered an improved performance in rhythmic dictation from pre-test to post-test, the most positive improvement by far being that of the external group; the internal group measured some improvement, whereas the control group measured only a very small improvement.

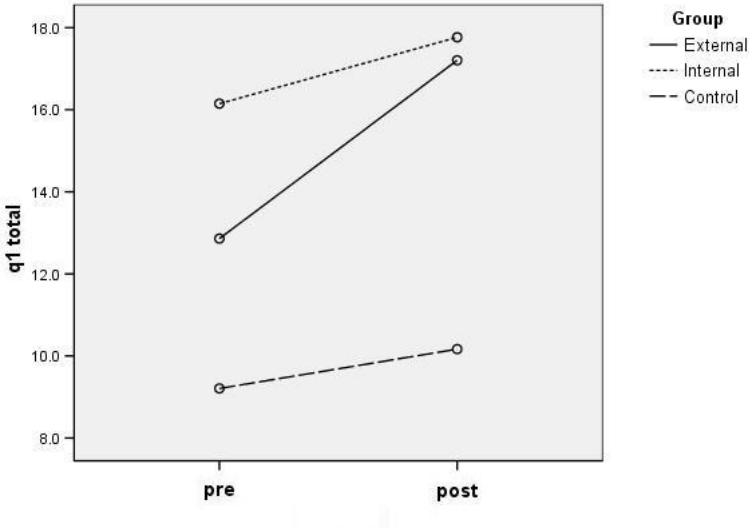


Figure 5.11. Question 1: Change pre-test to post-test by group

Figure 5.12 shows that, with one exception (A10), every individual improved in Question 1 as a whole. The decline in the performance of A10 is attributed to a poorer result for Question 1(c) in contrast to a slight improvement for Question 1(a) and achieving the same result in both pre-test and post-test for Question 1(b). Section 5.3.1.4 gives further discussion relating to A10.

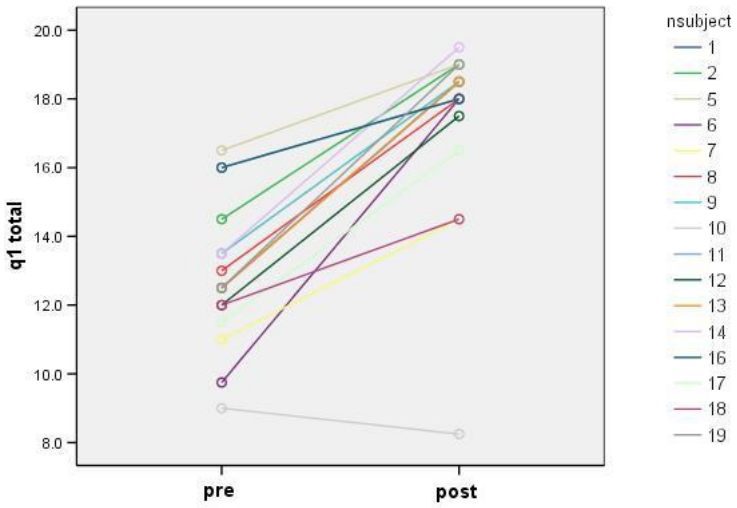


Figure 5.12. Question 1: Change pre-test to post-test by individual for Group A

5.3.1.2 Group A: Question 1(a)

A ceiling effect is strongly in evidence. Only two subjects (A6 and A10) failed to achieve the maximum score for rhythm (a) in the pre-test; both improved their score by 0.25 for the post-test, but this resulted in a maximum score for A6 only.

5.3.1.3 Group A: Question 1(b)

Overall, the range of scores within each group was greater for rhythm (b) than for rhythm (a). Group A achieved the greatest increase of the three groups for this rhythm. In Group A, seven of the subjects achieved the maximum possible in both tests; one (A10) scored only 3 out of a possible maximum of 8 both times; all others registered an improvement. Some of these (A1, A6 and A13) showed a considerable increase from 5 to 8 and some a less marked increase. Only one (A9) registered a (slightly) decreased score.

5.3.1.4 Group A: Question 1(c)

The greater complexity of rhythm (c) meant the results for this question were more telling and far more varied than for the previous two rhythms.

In Question 1(c), Group A registered a considerable improvement, slightly more so than for Group B. In Group A, no subject achieved the maximum result in either the pre-test or post-test, but many of them showed a significant and remarkable improvement: three

subjects increased from 1.5 in the pre-test to 7.5 in the post-test, out of a possible maximum of 8, and two registered an increase from 1 to 6. Only one subject (A10) showed a decrease, from 2.5 to 1.5.

Table 5.10

Question 1: Scores for subject A10

	Maximum possible	Pre-test	Post-test
Question 1(a)	4.00	3.50	3.75
Question 1(b)	8.00	3.00	3.00
Question 1(c)	8.00	2.50	1.50
Question 1 total	20.00	9.00	8.25

The fact that both results for rhythm (c) were poor (see Table 5.10), and that this subject improved only marginally in rhythm (a) and achieved the same result both times for rhythm (b), suggest that s/he is challenged in this area of aural acuity, and that enrolment in external mode may not be helpful to this subject for rhythmic work. A10 is a female pianist aged 25 at the time of testing, with 18 years of tuition and achieving Grade 8 standard, and with no second instrument. Of the other subjects in Group A, 14 were female, so gender is not a contributing factor. Age also does not appear to be a factor, since at the time of testing, one other subject was 20 years old, one was 22, one was 30 and two were 31, making five subjects with an age range of 5-6 years either side of A10; the other ten subjects were all 37 years or older. Eleven of the other subjects also were pianists, eliminating choice of instrument. A10 had the longest tuition period, of 18 years; the next longest tuition periods were 15 years (three subjects) and 14 years (one subject); it is therefore unlikely that length of tuition was a factor. Whilst all subjects had achieved a standard of between Grade 7 and Licentiate, the fact that six other subjects also had achieved a Grade 8 standard rules out the instrumental standard achieved as a contributing factor. Additionally, there were eight other subjects who also had indicated they had not studied a secondary instrument. There appear, therefore, to be no associated demographic causes to account for A10's declining performance in rhythm work.

The most obvious difference in this group for the total for Question 1 belonged to subject A6 who improved from 9.75 to 18 out of a possible maximum of 20. This was largely attributed to a far better performance for Question 1(c), the most complex of the three

rhythms, as shown in Table 5.11. An improvement in Question 1(b) from 5/8 to 8/8 also contributed.

Table 5.11

Question 1: Scores for subject A6

	Maximum possible	Pre-test	Post-test
Question 1(a)	4.00	3.75	4.00
Question 1(b)	8.00	5.00	8.00
Question 1(c)	8.00	1.00	6.00
Question 1 total	20.00	9.75	18.00

In Question 1(c) in the post-test, this same student improved as shown in Figures 5.13 and 5.14.

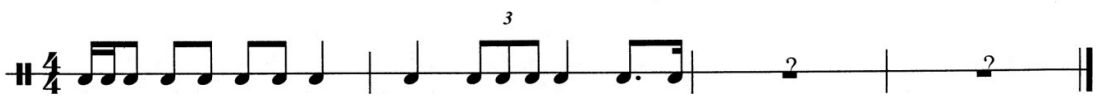


Figure 5.13. Question 1(c): Pre-test response for A6

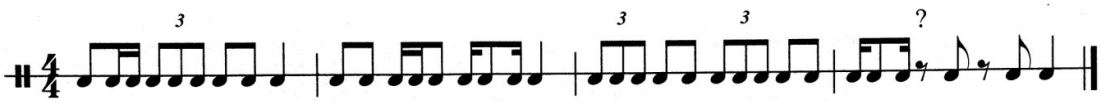


Figure 5.14. Question 1(c): Post-test response for A6

No demographic considerations were found pertinent to this subject that might have contributed to the improved rhythmic perception. A6 is a female pianist aged 50 at the time of testing, with 10 years of tuition and achieving Grade 7 standard, and having studied double bass as a second instrument for four months. The two other subjects who registered a difference of +3.00 in Question 1(b) were A1 and A13; both were female, one a trumpeter and one a pianist respectively, with six years and 15 years of tuition respectively, the trumpeter having undertaken no formal examinations but the pianists having gained a Licentiate qualification, and neither having a second instrument. For Question 1(c), one other subject (A8) achieved a difference of +5.00 – the same as for A6 – and three others (A9, A1 and A19) a difference of +5.50 – greater than for A6. All except one were female; the females were pianists and the male a guitarist; the three females had had tuition periods of 15 years, ten years, and four years and ten months (one subject) while the male had had tuition for one year and six months. One subject had achieved a Licentiate qualification, two had

achieved Grade 8, and one had no formal executant qualification. Only one of the subjects had a second instrument – violin, for which one year and two months' tuition had been received.

5.3.2.1 Question One Total: Group B

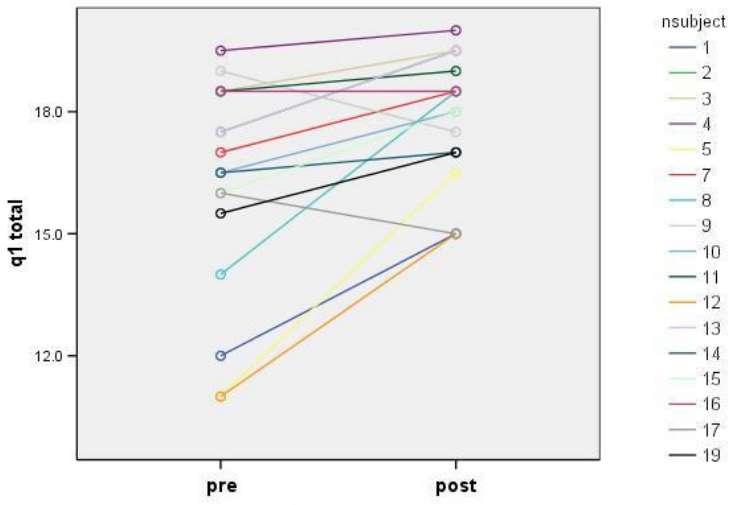


Figure 5.15. Question 1: Change pre-test to post-test by individual for Group B

Figure 5.15 indicates that most subjects in Group B improved for Question 1 overall, with three subjects achieving a marked positive difference, but two subjects achieving a negative difference overall.

5.3.2.2 Group B: Question 1(a)

Group B found the first rhythm less challenging than Group A, as confirmed by Tables 5.6 and 5.7. All subjects achieved a full score (4/4) for rhythm (a) in the pre-test, except for B5 who scored 3/4. Every subject obtained a full score in the post-test.

5.3.2.3 Group B: Question 1(b)

As with Group A, the range of scores in Group B was much greater for rhythm (b) than for rhythm (a). Most subjects in the group showed an increased score in the post-test for Question 1(b); the only exceptions were B16 who maintained the same score, B17 (- 2.0) and B9 (- 0.5). The breakdown of these subjects' scores is shown in Table 5.12, and Figure 5.15 also illustrates these three subjects moving against the group trend.

5.3.2.4 Group B: Question 1(c)

In Question 1(c), Group B registered a slightly smaller improvement than did Group A for the same rhythm. The means for Group A rose 3.56 from 2.34 to 5.90, whereas that for Group B rose only 1.15 from 4.82 to 5.97. Question 1(c) was problematic for subjects B9 and B16 (see Table 5.12).

Table 5.12

Question 1: Scores for subjects B9, B16, B17

	Maximum possible	B9		B16		B17	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Question 1(a)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Question 1(b)	8.0	8.0	7.5	8.0	8.0	8.0	6.0
Question 1(c)	8.0	7.0	6.0	6.5	6.5	4.0	5.0
Question 1 total	**20.0**	**19.0**	**17.5**	**18.5**	**18.5**	**16.0**	**15.0**

Whilst B16 maintained ceiling scores for Questions 1(a) and (b), and also maintained the same score for Question 1(c), the response to this question was different from pre-test to post-test (see Figures 5.16 and 5.17).

Figure 5.16. Question 1(c): Pre-test response for B16

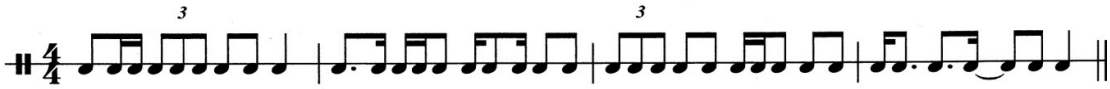


Figure 5.17. Question 1(c): Post-test response for B16

B9 made errors in bar 2, beats 2 and 3 in the post-test where they had been correct in the pre-test; bar 4, beats 1 and 2 were incorrect (albeit differently) in both tests (see Figures 5.18 and 5.19).

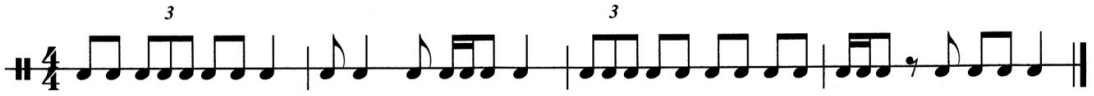


Figure 5.18. Question 1(c): Pre-test response for B9

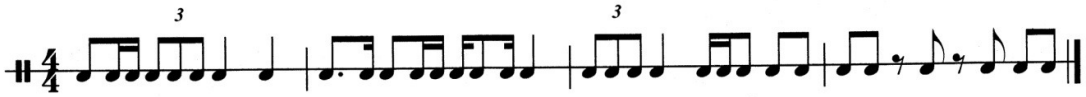


Figure 5.19. Question 1(c): Post-test response for B9

B17 gave far more varying responses which did not reveal any clear logic; although the results recorded an improvement for this subject for rhythm (c) from 4/8 to 5/8, it cannot reasonably be argued that s/he improved in skill or understanding for more complex rhythmic work.

It is unclear whether the performance of B17 for rhythm (c) was attributable to any demographic considerations, although conjecture is possible. B17 is a female singer. The other singers, all female, are B1, B2, B5 and B12. It can be noted from Table 5.9 that these subjects were, in general terms at least, weaker in the complex rhythm than the remainder of the group, even though each registered an improvement from pre-test to post-test.

5.3.3.1 Question One Total: Group C

Figure 5.20 indicates no clear trend shown in Group C for Question 1. The results for this group were more mixed than for the other two groups, as shown in Table 5.13.

Table 5.13

Question 1: Change pre-test to post-test by individual for Group C

Subject	Question 1(a)[1]		Question 1(b)[2]		Question 1(c)[2]		Question 1 total[3]	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1	4.00	4.00	6.50	6.00	3.00	3.50	13.50	13.50
2	4.00	4.00	5.00	4.50	2.50	0.50	11.50	9.00
3	4.00	4.00	3.50	6.00	2.00	1.50	9.50	11.50
4	3.50	3.75	3.50	3.00	1.50	1.50	8.50	8.25
5	1.75	2.75	4.00	5.00	1.50	1.00	7.25	8.75
6	4.00	4.00	8.00	8.00	4.50	6.00	16.50	18.00
7	0.00	1.25	0.00	2.50	0.00	0.00	0.00	3.75
8	4.00	4.00	6.50	5.50	0.50	1.50	11.00	11.00
9	3.75	2.50	1.00	3.50	1.50	1.00	6.25	7.00
11	4.00	4.00	5.50	8.00	1.50	2.50	11.00	14.50
13	2.50	3.25	2.00	3.00	0.00	0.00	4.50	6.25
14	4.00	4.00	5.00	5.50	2.00	1.00	11.00	10.50

[1] maximum = 4.00 [2] maximum = 8.00 [3] maximum = 20.00

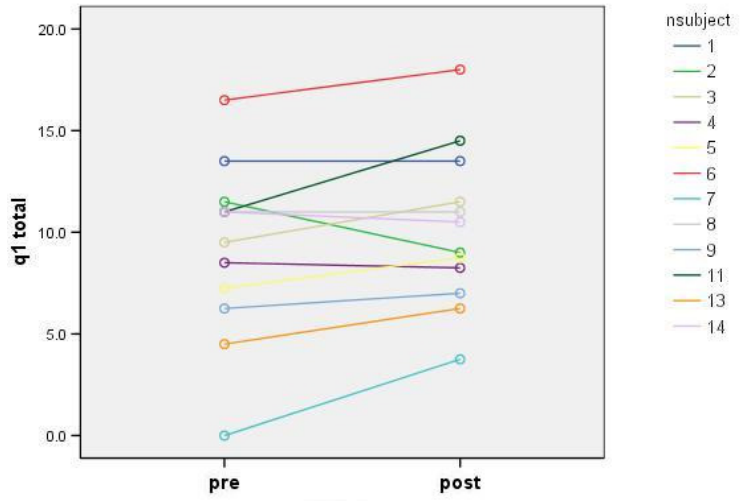


Figure 5.20. Question 1: Change pre-test to post-test by individual for Group C

Although not the only subjects in the group to register an improvement in their total score from pre-test to post-test, the largest improvement for this aspect was achieved by C3, C7, C11 and C13.

C7 stands out most obviously because of the total question score of 0/20 in the pre-test and of 3.75/20 in the post-test. At the head of this question in the pre-test, s/he wrote the comment "Do not know how to answer!" and did not attempt any responses; in the post-test all three parts were attempted, at least in part – all four bars for rhythm (a), the first two bars for rhythm (b) and the first two bars for rhythm (c).

The obvious question arises as to how C7, having had no relevant tuition during the treatment period, was able to improve from a zero result. One factor, at least, contributes to this phenomenon: the subject was completely unfamiliar with the procedure for this question at the time of the pre-test, but would have felt more comfortable by the time the post-test was administered. (The aspect of familiarity with the test procedure assisting to improve the performance is likely to have been experienced to a greater or lesser degree by any subject in any group and is a commonly acknowledged phenomenon.)

A marked improvement was made by C3, from 9.5/20 to 11.5/20, due to better performance in rhythm (b).

C11 showed an even greater increase in overall performance for Question 1, from 11/20 to 14.5/20; this was attributable to better performance in rhythm (b), and a smaller improvement in rhythm (c).

C13 made improvements in rhythms (a) and (b), but achieved a zero result for rhythm (c) in both pre-test and post-test.

5.3.3.2 Group C: Question 1(a)

For Question 1(a), seven subjects exhibited no difficulty (achieving full results in both pre-test and post-test) while the other five ranged in the pre-test from 0 (zero) to 3.75 out of a possible maximum of 20, and in the post-test from 1.25 to 3.75.

The result for C7 for rhythm (a) showed an improvement from 0/4 in the post-test, when no attempt was made to record an answer, to 1.25/4 in the post-test. All four bars were attempted; bars 1 and 2 were totally incorrect, and bars 3 and 4 were each partially correct.

C13 achieved 2.5/4 in the pre-test. The first two bars were totally correct; beats 1 and 2 of bar 3 were correct, but beats 3 and 4 were not attempted; and bar 4 was left totally blank. This shows confidence in the work that was completed but perhaps a limited ability to work quickly or efficiently. In the post-test, the result was improved to 3.25/4 because bar 3, beat 3 and all of bar 4 were additionally correct.

5.3.3.3 Group C: Question 1(b)

Showing the same trend as for Groups A and B, the range of scores achieved in Group C is much greater for rhythm (b) than for rhythm (a). In Group C, only one subject (C6) achieved a maximum result in the pre-test, this subject and one other (C11) scoring the maximum in the post-test. Whilst Group C registered an overall increase in performance for rhythm (b), it will be observed (see Table 5.15) that nearly half the group registered a decrease or no movement in their result from pre-test to post-test.

In the post-test, C7 attempted only the first two bars but this resulted in an increased score of 2.5/8: beats 1, 3 and 4 of bar 1, and beats 2 and 3 of bar 2 were correct.

5.3.3.4 Group C: Question 1(c)

Group C registered an overall marginal decrease in performance for Question 1(c), the mean dropping 0.3 from 1.96 to 1.66.

C7 and C13 both scored 0/8 for rhythm (c) in the post-test. C7 attempted the first two bars on this occasion, but the answers were faulty, even to the extent of containing an incorrect number of beats per bar.

C13 attempted only the first bar, which was incorrect and contained only three beats.

The responses provided by C6 were more positive. In both tests, bar 1 was completely accurate; bar 2 was correct only for the first beat in the pre-test, but in the post-test was totally accurate; in bar 3, beats 1 and 2 were correct in both tests, but beats 3 and 4 were reversed from pre-test to post-test, and in any case were inaccurate both times; bar 4 was notated identically in both tests, with accuracy only for the first and last beats of the bar.

5.4.1.0 Results: Question Two

In considering group responses for Question 2, Groups A and B recorded some improvement whereas Group C almost maintained the *status quo*. As with Question 1, the greatest improvement was shown by Group A (see Figure 5.21 and Table 5.14).

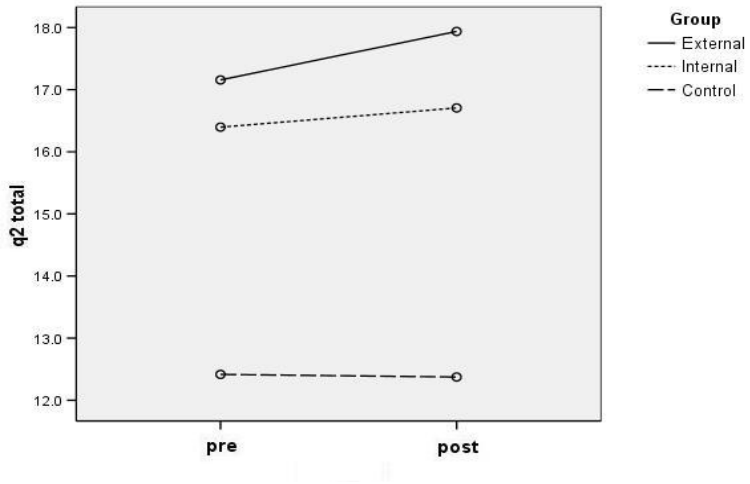


Figure 5.21. Question 2: Change pre-test to post-test by group

Whilst Group A made the greatest improvement, the improvement shown by Group B was only small, and Group C registered a slight decrease in performance. This represents some differences from Question 1 in which all groups made some improvement, and in which the improvement was greater than for Question 2. The ceiling effect which is apparent in some other parts of the test results does not apply for this question. Tables 5.15 – 5.17 show the breakdown of raw scores for each melody of Question 2.

In Group A, all except two subjects achieved full marks in both the pre-test and the post-test for melody (a); the same applied for Group B. By contrast, only half of Group C achieved full marks in the pre-test; of the remainder of this group, three exhibited a positive difference, one remained on the same score, and one exhibited a decline in performance. This reveals that while Groups A and B showed a stable performance for this question for the duration of the project, Group C which did not undergo any training exhibited an uneven and unstable performance.

Table 5.14

Question 2: Overview of totals for all groups

Question	Group A			Group B			Group C		
	Pre-test Mean[1]	Post-test Mean[1]	Difference	Pre-test Mean[1]	Post-test Mean[1]	Difference	Pre-test Mean[1]	Post-test Mean[1]	Difference
(a)	98.43	99.22	+ 0.79	98.89	100.00	+ 1.11	75.00	83.33	+ 8.33
(b)	84.37	88.67	+ 4.30	82.35	83.45	+ 1.10	63.54	59.37	- 4.17
(c)	80.85	85.93	+ 5.08	73.16	75.37	+ 2.21	54.16	53.64	- 0.52
TOTAL	**85.78**	**89.68**	**+ 3.90**	**81.98**	**85.53**	**+ 1.55**	**62.08**	**61.87**	**- 0.21**

[1] % measurement

Table 5.15

Question 2(a): Raw scores for all groups

	Group A (n=16)		Group B (n=17)		Group C (n=12)	
Subject	**Pre-test[1]**	**Post-test[1]**	**Pre-test[1]**	**Post-test[1]**	**Pre-test[1]**	**Post-test[1]**
1	3.50	4.00	3.50	4.00	4.00	4.00
2	4.00	4.00	4.00	4.00	4.00	4.00
3	not applicable		3.75	4.00	2.00	2.00
4	not applicable		4.00	4.00	1.50	1.50
5	4.00	4.00	4.00	4.00	2.00	3.00
6	4.00	4.00	not applicable		4.00	4.00
7	4.00	4.00	4.00	4.00	2.00	1.50
8	4.00	4.00	4.00	4.00	2.50	4.00
9	4.00	4.00	4.00	4.00	2.00	4.00
10	3.50	4.00	4.00	4.00	not applicable	
11	4.00	4.00	4.00	4.00	4.00	4.00
12	4.00	4.00	4.00	4.00	not applicable	
13	4.00	4.00	4.00	4.00	4.00	4.00
14	4.00	4.00	4.00	4.00	4.00	4.00
15	not applicable		4.00	4.00	not applicable	
16	4.00	4.00	4.00	4.00	not applicable	
17	4.00	3.50	4.00	4.00	not applicable	
18	4.00	4.00	not applicable		not applicable	
19	4.00	4.00	4.00	4.00	not applicable	
Mean	**3.94**	**3.97**	**3.95**	**4.00**	**3.00**	**3.33**

[1] maximum = 4.00

Table 5.16
Question 2(b): Raw scores for all groups)

Subject	Group A (n=16)		Group B (n=17)		Group C (n=12)	
	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]
1	6.00	7.50	7.50	6.00	7.00	7.00
2	8.00	8.00	4.00	4.00	8.00	6.00
3	not applicable		7.50	8.00	4.00	4.00
4	not applicable		6.50	7.50	2.50	3.00
5	7.00	8.00	5.50	6.00	3.50	3.00
6	8.00	8.00	not applicable		7.50	6.50
7	7.50	8.00	5.00	7.50	1.00	3.00
8	8.00	8.00	5.50	7.00	4.00	3.50
9	4.50	5.50	8.00	8.00	4.00	4.00
10	4.50	5.50	8.00	8.00	not applicable	
11	8.00	8.00	5.50	6.50	7.50	8.00
12	8.00	8.00	6.00	4.50	not applicable	
13	8.00	7.50	5.50	6.00	4.00	4.50
14	7.50	8.00	8.00	8.00	8.00	4.50
15	not applicable		7.00	7.00	not applicable	
16	8.00	7.50	8.00	7.00	not applicable	
17	4.00	4.50	6.50	6.00	not applicable	
18	7.00	5.00	not applicable		not applicable	
19	4.00	6.50	8.00	6.50	not applicable	
Mean	**6.75**	**7.09**	**6.59**	**6.67**	**5.08**	**4.75**

[1] maximum = 8.00

Table 5.17
Question 2(c): Raw scores for all groups

Subject	Group A (n-16)		Group B (n=17)		Group C (n=12)	
	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]
1	5.50	5.0	5.5	6.5	5.0	3.5
2	8.00	8.0	5.5	5.5	4.0	7.0
3	not applicable		6.5	5.5	3.0	4.0
4	not applicable		3.0	4.0	3.5	2.0
5	8.00	7.0	2.5	5.0	2.5	1.0
6	8.00	8.0	not applicable		6.5	7.0
7	5.50	6.5	5.0	7.0	3.5	2.5
8	8.00	8.0	6.0	7.5	4.0	4.0
9	4.50	5.0	8.0	8.0	4.0	5.0
10	6.00	6.5	8.0	8.0	not applicable	
11	6.50	8.0	4.5	5.0	7.0	7.5
12	7.00	8.0	4.5	4.5	not applicable	
13	8.00	8.0	5.0	7.5	4.0	3.0
14	6.50	8.0	8.0	5.0	5.0	5.0
15	not applicable		7.0	5.5	not applicable	
16	5.50	6.5	8.0	8.0	not applicable	
17	6.00	6.0	5.5	4.0	not applicable	
18	5.50	6.0	not applicable		not applicable	
19	5.00	5.5	7.0	6.0	not applicable	
Mean	**6.46**	**6.87**	**5.85**	**6.03**	**4.33**	**4.29**

[1] maximum = 8.00

For melody (b) a mild improvement is registered for Group A, a minimal improvement for Group B, and a mild decrease for Group C.

For melody (c), once again a mild improvement is registered for Group A, a minimal improvement for Group B and a slight decrease for Group C. In Group A, nine (56.25%) exhibit an increased performance from pre-test to post-test, five (31.25%) gained the same score, and two (12.5%) performed more poorly. In Group B seven subjects (41.18%) improved, five (29.41%) remained the same, and five (29.41%) regressed. In Group C, five (41.67%) improved, two (16.66%) remained the same, and five (41.67%) performed more poorly.

Reference to Tables 5.18 and 5.19 shows that some subjects did not achieve as well for melodic dictation in the post-test as in the pre-test. Despite the claim of Simmonds (1978) that pitch perception was dependent on the state of the listener, it is unlikely to be coincidental that so many more subjects in Group B than in Group A suffered the decline in performance. As this is unexplained, further research into the phenomenon is necessary, especially bearing in mind the ceiling effect – Group B may have become careless because they already knew it was so easy.

The subjects for whom this was the case were A13, A18, B3, B12, B14, B15, B16, B17, and B19. The two students from Group A both declined on account of poorer performance for melody (b), which was also the case for B12 and B16, whilst B17 and B19 declined in both melody (b) and melody (c); B3, B14 and B15 measured a poorer performance for melody (c) only. Those experiencing difficulty with melody (b) most commonly made one of four errors: they either (i) misjudged the ascending 5^{th} in bar 1, (ii) used an incorrect pitch as the first note of bar 2 (e.g., using the leading note rather than the submediant), (iii) wrote bar 3 moving in a pattern of broken thirds rather than moving in steps, or (iv) used an incorrect pitch as the first note of bar 4, (e.g., the mediant or subdominant rather than the supertonic); those experiencing difficulty with melody (c) almost uniformly commenced on the tonic rather than the mediant.

It is important to consider and to give training in a variety of contextual settings because it is acknowledged that perception can vary according to context. It has been reported, for example, that both performance and perception of melodies were less accurate for ascending patterns than for descending patterns (Killian, 1991). Several examples were found amongst the completed tests which supported Killian's findings. The stepwise structure of melody (a) meant that it was successfully dictated by almost all subjects; however, bar 3

was notated a step too high by A1, indicating the ascending interval from bar 2 to bar 3 was misjudged. Melody (b) provided more numerous examples: for example, the ascending 5th in bar 1 was frequently replaced with a 3rd (i.e., 1-1-3-3 rather than 1-1-5-5), with the consequence that the first note of bar 2 frequently also was incorrect; bar 3 was often given as broken 3rds (e.g., 4-6-3-5 rather than 4-5-3-4) so that the ascending 2nds are misrepresented as ascending 3rds; in bar 4 the ascending interval between the first two notes is commonly incorrect, usually as a consequence of one or other pitch being incorrect (e.g., 2-4-1, 4-5-1, or 2-3-1). In melody (c) the most common errors to support Killian were (i) to misjudge the rising 5th in bar 1 (frequently mistaken for the mediant, submediant or, less often, the subdominant), and (ii) to misjudge the ascending octave in bar 3. Several subjects in this situation used 5-4-3-2-1-6 (i.e., the rising interval to the first note of this bar was inaccurately perceived) rather than 3-2-1_1-7_1-6_1-6, probably realising the final 6 to be correct because of the descending run to the tonic that follows in bar 4, but apparently failing to identify the ascending octave leap to this pitch. The most unorthodox misperception was 5_1-1^1 rather than 6_1-6.

5.4.1.1 Question Two Total: Group A

Figure 5.22 shows that most individuals in Group A registered an improvement.

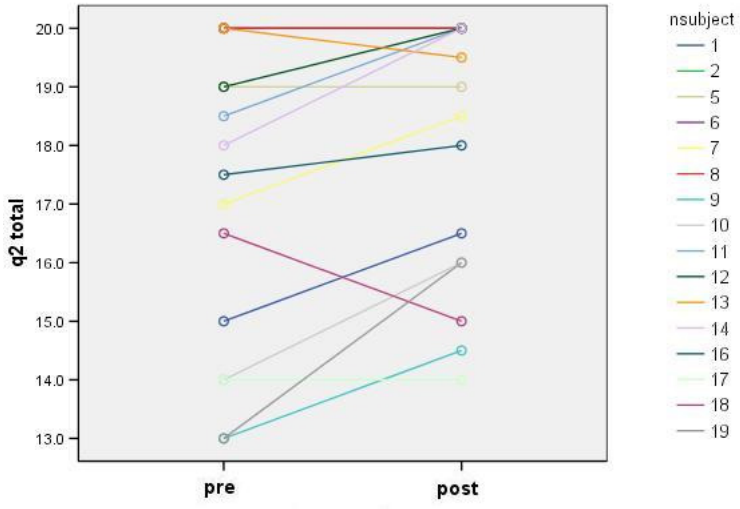


Figure 5.22. Question 2: Change pre-test to post-test by individual for Group A

Table 5.18

Question 2: Change pre-test to post-test by individual for Group A

Subject	Question 2(a)[1]		Question 2(b)[2]		Question 2(c)[2]		Question 2 total[3]	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1	3.5	4.0	6.0	7.5	5.5	5.0	15.0	16.5
2	4.0	4.0	8.0	8.0	8.0	8.0	20.0	20.0
5	4.0	4.0	7.0	8.0	8.0	7.0	19.0	19.0
6	4.0	4.0	8.0	8.0	8.0	8.0	20.0	20.0
7	4.0	4.0	7.5	8.0	5.5	6.5	17.0	18.5
8	4.0	4.0	8.0	8.0	8.0	8.0	20.0	20.0
9	4.0	4.0	4.5	5.5	4.5	5.0	13.0	14.5
10	3.5	4.0	4.5	8.0	6.0	6.5	14.0	16.0
11	4.0	4.0	8.0	8.0	6.5	8.0	18.5	20.0
12	4.0	4.0	8.0	8.0	7.0	8.0	19.0	20.0
13	4.0	4.0	8.0	7.5	8.0	8.0	20.0	19.5
14	4.0	4.0	7.5	8.0	6.5	8.0	18.0	20.0
16	4.0	4.0	8.0	7.5	5.5	6.5	17.5	18.0
17	4.0	3.5	4.0	4.5	6.0	6.0	14.0	14.0
18	4.0	4.0	7.0	5.0	5.5	6.0	16.5	15.0
19	4.0	4.0	4.0	6.5	5.0	5.5	13.0	16.0

[1] maximum = 4.00 [2] maximum = 8.00 [3] maximum = 20.00

5.4.1.2 Group A: Question 2(a)

The scores for Question 2(a) indicate the ceiling effect in operation (refer to Table 5.18). A1 and A10 were the only two subjects not to achieve a full score for melody (a) in the pre-test. In bar 3, A1 used an accurate contour, but misjudged the starting note for the bar by writing a step too high; the pitch was correct in the post-test. A10 made the identical error which also was corrected in the post-test.

Whereas the scores for A1 and A10 increased by 0.5/4, A17's performance decreased by that amount. In the post-test, this subject misjudged the descending intervals in bar 2 to write G-E-C instead of G-F-E. A17 indicated in a note appended to the demographic survey that s/he suffered from chronic fatigue syndrome which, whilst improving, affected the speed of perception and execution as well as the effectiveness of short term memory.

5.4.1.3 Group A: Question 2(b)

Two subjects show a decrease in performance; that of A13 is unremarkable, but A18 with a negative difference of -2.0 is noteworthy. The breakdown of A18's results can be seen in Table 5.18.

Figures 5.23 and 5.24 show that A18 experienced some difficulty in gauging accurately the size of intervals heard in context. The correctly identified perfect 5th in bar 1 in the pre-test is notated as only a major 3rd in the post-test with a consequent compensation in bar 2; the undulating contour of bar 3 is represented as more angular in the post-test, and on both occasions s/he fails to identify the first note of bar 4 as the supertonic (refer to Appendix 6 for the correct answer).

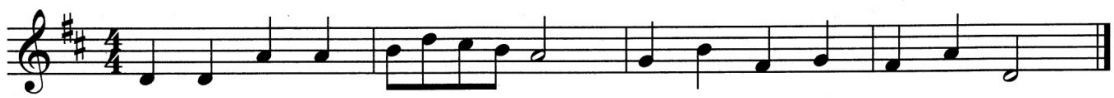


Figure 5.23. Question 2(b): Pre-test response for A18

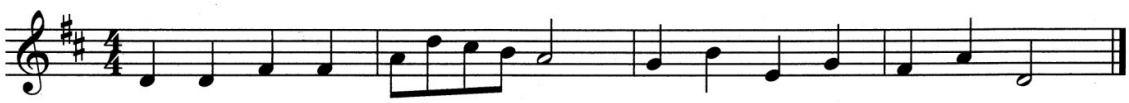


Figure 5.24. Question 2(b): Post-test response for A18

5.4.1.4 Group A: Question 2(c)

Group A records a mean difference of +5.08% for melody (c). The performance of nine subjects in the group improves; for five it remains the same; and for two it decreases. Of those showing improvement, the raw score for four of them increases by 0.5; that for three by +1.0; and that for two (A11, A14) by +1.5.

A11's pre-test responses contained errors in bars 1 and 2. In bar 1 the ascending interval used was only a major 3rd (F-A) instead of a perfect 5th (F-C), and in bar 2 the contour was accurate but written a step high (Bb-C rather than A-Bb); these errors were corrected in the post-test responses.

A14 wrote bar 1 to end with an ascending perfect 4th (F-Bb instead of F-C), and in bar 3 the descending pattern was pitched a step low (Bb-A-G-F-E rather than A-G-F-E-D) which also did not take into account the rising octave interval (D-D) that concludes the bar; like A11, these errors were corrected in the post-test responses.

A17 maintained the same score for melody (c) on both occasions. In the pre-test, although the contour of the first two bars was recognized, the intervals and the pitching were

variable. Similar problems occurred in the same bars in the post-test, but with different errors (see Figures 5.25 and 5.26).

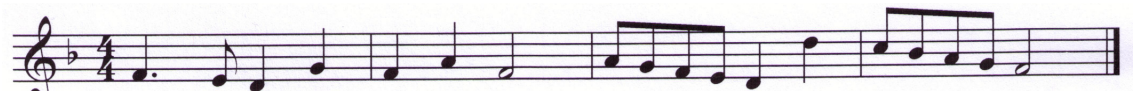


Figure 5.25. Question 2(c): Pre-test response for A17

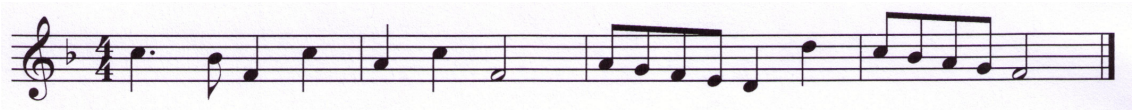


Figure 5.26. Question 2(c): Post-test response for A17

5.4.2.1 Question 2 Total: Group B

Like Group A, Group B also showed a mixture of increased and decreased performance for melodic dictation, as illustrated in Figure 5.27, and in more detail in Table 5.19.

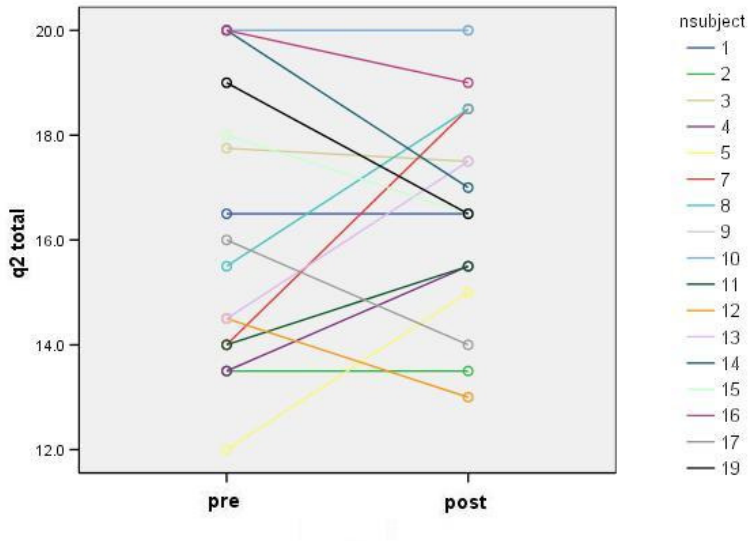


Figure 5.27. Question 2: Change pre-test to post-test by individual for Group B

Referring to Table 5.19, note that B14 and B16 achieved full marks for melodic dictation in the pre-test, but less than full marks for the same question in the post-test. Further, B19 achieved almost a full score (19/20) for the pre-test but scored the lower total of 16.5/20 in the post-test, a difference of -2.5.

5.4.2.2 Group B: Question 2(a)

A clear ceiling effect applies to the scores for the first melody. Only B1 and B3 made any errors at all, these occurring in the pre-test. In bar 2, B1 misjudged the intervals in the descending figure, giving the triadic G-E-C rather than the stepwise G-F-E. In bar 3, B3 notated the first pitch as D instead of F, which, although incorrect, accurately recognises the interval relationship across the barline from bar 2 to bar 3.

5.4.2.3 Group B: Question 2(b)

For melody (b), seven of the group registered an improvement, five retained the same score, and five registered a decreased achievement. One subject (B7) achieved a positive difference of +2.5, another one (B8) of +1.5, two of +1.0 (B4 and B11), and three of +0.5 (B3, B5 and B13).

Table 5.19

Question 2: Change pre-test to post-test by individual for Group B

Subject	Question 2(a)[1]		Question 2(b)[2]		Question 2(c)[2]		Question 2 total[3]	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
1	3.50	4.00	7.50	6.00	5.50	6.50	16.50	16.50
2	4.00	4.00	4.00	4.00	5.50	5.50	13.50	13.50
3	3.75	4.00	7.50	8.00	6.50	5.50	17.75	17.50
4	4.00	4.00	6.50	7.50	3.00	4.00	13.50	15.50
5	4.00	4.00	5.50	6.00	2.50	5.00	12.00	15.00
7	4.00	4.00	5.00	7.50	5.00	7.00	14.00	18.50
8	4.00	4.00	5.50	7.00	6.00	7.50	15.50	18.50
9	4.00	4.00	8.00	8.00	8.00	8.00	20.00	20.00
10	4.00	4.00	8.00	8.00	8.00	8.00	20.00	20.00
11	4.00	4.00	5.50	6.50	4.50	5.00	14.00	15.50
12	4.00	4.00	6.00	4.50	4.50	4.50	14.50	13.00
13	4.00	4.00	5.50	6.00	5.00	7.50	14.50	17.50
14	4.00	4.00	8.00	8.00	8.00	5.00	20.00	17.00
15	4.00	4.00	7.00	7.00	7.00	5.50	18.00	16.50
16	4.00	4.00	8.00	7.00	8.00	8.00	20.00	19.00
17	4.00	4.00	6.50	6.00	5.50	4.00	16.00	14.00
19	4.00	4.00	8.00	6.50	7.00	6.00	19.00	16.50

[1] maximum = 4.00 [2] maximum = 8.00 [3] maximum = 20.00

B7's pre-test response was correct until the second note of bar 2; from this point to the end, every note was one step too high. The post-test response was entirely accurate with the exception of the final note of bar 3 which was given as A instead of G.

B8 had a similar problem in the pre-test, but for all of bars 2 and 3 and the first note of bar 4 identified the pitch as one step too low. In the post-test s/he notated only two inaccurate

pitches, both in bar 4. The second note was given a step high as B instead of A, and the fourth note similarly as A instead of G.

Five subjects registered negative differences: three of -1.5 (B1, B12 and B19), one of -1.0 (B16) and one of -0.5 (B17).

B1 notated only one incorrect pitch in the pre-test – the penultimate note of bar 4 as G instead of the dominant note, A; in the post-test, however, the first bar is the only one notated with complete accuracy. Bar 2 was accurate except for beginning with C# instead of B; bar 3 used a similar contour but with a wider range (G-C#-F#-B instead of G-A-F#-G) and in bar 4 the anticipated dominant A was replaced with C# so that the melody concluded with a descending major 7^{th}.

B12 gave bar 1 with complete accuracy, but in bar 2 the first note was given as C# rather than B; in bar 3 the contour was close, with the pitch given as A-C#-F#-A rather than G-A-F#-G; and in bar 4 the penultimate note was given as F# rather than the dominant, A. By contrast, the post-test response contained inaccurate notation in every bar. In bar 1 this subject misjudged the perfect 5^{th} interval D-A to give only a major 3^{rd} D-F#. Consequently, bar 2 began too low, the first two notes showing as A-B instead of B-D. In bar 3 B12 again, as in the pre-test, used 3^{rds} rather than 2^{nds} but this time gave the pitches lower at F#-A-E-G.

For B16, melody (b) is the only one of the three for which a lower score was achieved in the post-test (see Table 5.19).

Here the zig-zag contour was "smoothed out" to maintain a logical "skeletal" framework (i.e., the "skeleton" for bars 3-4 is G-F#-E-D) even though the detail of the contour was incorrect. It is possible the similarity of this melody to a nursery tune may have been a contributing factor (see Figure 5.28).

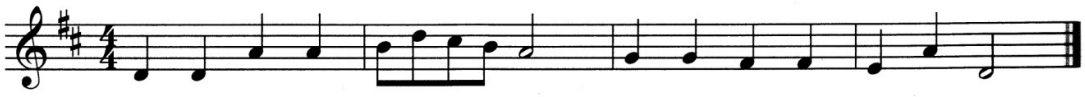


Figure 5.28. Question 2(b): Post-test response for B16

B19 scored lower on both the second and third melodies, as shown in Table 5.19. This subject achieved a full score for the second melody in the pre-test, but in the post-test misjudged the intervals in the detail of the contour for bars 3-4, even though, as with B16, the "skeletal" contour on beats 1 and 3 of bars 3 and 4 was accurate, illustrated in Figure 5.29.

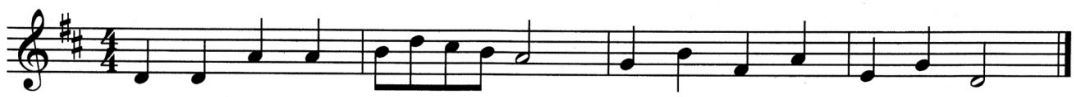


Figure 5.29. Question 2(b): Post-test response for B19

5.4.2.4 Group B – Question 2(c)

For the final melody, seven of the group achieved a positive difference, five retained the same score, and five achieved a negative difference. This is similar to the results for Question 2(b), although the spread of results is different.

Two subjects achieved a positive difference of +2.5 (B5 and B13), one of +2.0 (B7), one of +1.5 (B8), two of +1.0 (B1, B4), and one of +0.5 (B11).

For B5 in the pre-test, the only correct pitches were the tonic notes which occur in bar 1, beat 3, and the final note. The first bar used an inaccurate contour, descending only in 3rds, C^1-A-F-D; the second bar likewise was given as descending 3rds, C^1-A-F; the close similarity between bars 1 and 2 in the subject's response indicates that B5 possessed only poor melodic perception at the time the pre-test was administered.

Of the five female singers in Group B, B5 was the only mezzo soprano, and had the longest tuition period – eight years – compared with the others which ranged between six years and two years and nine months. B5 had achieved a Grade 8 qualification, which was the highest of the group. B5 had also studied piano as a secondary instrument for one year and had achieved a Grade 2 qualification; 12 others had a second instrument, of which there were three pianists, two violinists, one double bassist, one bass guitarist, one saxophonist, two trombonists, one euphonium player, and one percussionist. B5 was the oldest subject in Group B at 19 years and 10 months at the time of the pre-test, while the youngest subject was 17 years and two months at that time – a difference of only two years and eight months. There does not appear, therefore, to be any demographic information to explain B5's poor performance in melodic work.

In the post-test, however, although B5 still experienced some problems with melodic perception, the level of skill for this acuity showed considerable improvement following tuition. Bar 1 used the correct contour, but with the pitch given as F-E-D-A rather than A-G-F-C^1; bar 2 used an inverted contour (^{v} rather than ^), and although the intervals were not

accurate, the relationship between them was similar to the correct melody, given as G-F-Bb rather than A-Bb-G; and bars 3 and 4 were accurate.

In the pre-test, the final bar was the only one given correctly by B13, although bars 1-3 featured contours which were largely accurate. Bar 1 was a 3rd too high, commencing on C^1 rather than A; bar 2 was given as C^1-D^1-A rather than A-Bb-G; and bar 3 was a 5th high, commencing on E^1 rather than A, with the final note a 3rd high (i.e., F^1 rather than D^1). Performance in the post-test was greatly improved, with only one inaccurate pitch: the final note in bar 1 was notated a tone high as D^1 instead of C^1.

The pre-test and post-test responses by B7 for melody (c) also revealed an improved melodic perception following tuition. In the pre-test, only bars 1 and 4 were correct; bar 3 had an accurate contour but was pitched a 3rd high; bar 2, however, was given an inaccurate contour (^{v} rather than ^) although the intervals were correct, that is, Bb-A-C^1 rather than A-Bb-G. The post-test response was almost totally accurate, the only error being to place the descending run in bar 3 a step high.

One subject (B14) registered a large negative difference of -3.0, whilst two others registered differences of -1.5 (B15 and B17), and two registered a difference of -1.0 (B3 and B19).

The breakdown of results for Question 2 (see Table 5.19) shows B14's performance in the post-test decreased for the third melody only. B14 identified the starting note incorrectly as the tonic which rendered the whole of bar 1 and the first half of bar 2 completely wrong although the contour was correct, while the end of bar 2 did not follow the contour (see Figure 5.30).

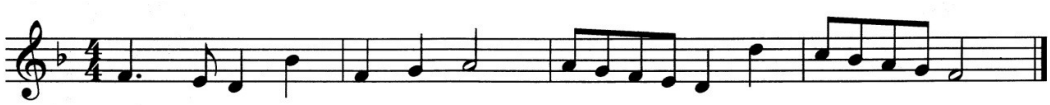


Figure 5.30. Question 2(c): Post-test response for B14

B15 had a high rate of accuracy for melody (c) in the pre-test, with only two incorrect pitches: in bar 1 the final note was given as G, rising only a tone rather than a 4th to C^1. In the post-test, however, there were several inaccuracies: bar 1, whilst having a similar contour to the actual melody, pitched the first three notes a 3rd low and the fourth note a tone high; in bar

2 the second pitch was notated as C^1 rather than Bb; and in bar 3 the descending run was notated a 3rd low, commencing on F instead of A.

In the pre-test, B17 gave inaccurate notation in bars 1 and 2, but bars 3 and 4 were correct: like B15's post-test response, bar 1 pitched the first three notes a 3rd low and the fourth note a tone high; in bar 2 the intervals were too wide, with the pitch notated as F-Bb-E rather than A-Bb-G. In the post-test, only bar 4 was accurate; on this occasion all of bar 1 was notated a 3rd low; bar 2 was given a stepwise descending contour with the pitches G-F-E rather than the ^ contour of A-Bb-G; and bar 3 was written a step low, commencing on G rather than A.

B3 notated only three incorrect pitches in the pre-test: the final note of bar 2 rose to C^1 rather than falling to G; and beats 3 and 4 in bar 3 were written rising from C to A rather than from D to D^1. By contrast, the first bar in the post-test was all notated a 3rd low; in bar 2, B3 experienced a similar problem to B17 in the pre-test, using intervals which were too wide, with pitch notated as E-Bb-F rather than A-Bb-G. Bars 3 and 4 were notated accurately.

For B19, the third melody failed on either occasion to achieve a full score (see Figures 5.31 and 5.32): in the pre-test bar 2 used an accurate contour but with three incorrect pitches; in the post-test bar 1 used an accurate contour but incorrectly began a 3rd low on the tonic, with consequent errors in bar 2, somewhat similar to the response given by B14 (cf., Figure 5.30).

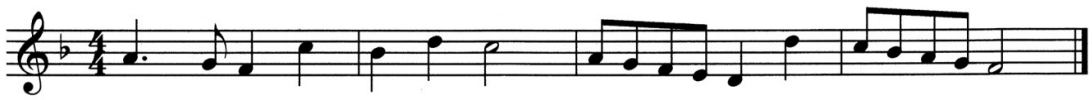


Figure 5.31. Question 2(c): Pre-test response for B19

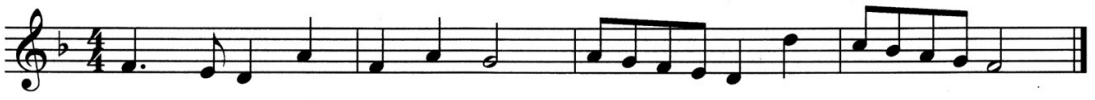


Figure 5.32. Question 2(c): Post-test response for B19

5.4.3.1 Question Two Total: Group C

Figure 5.33 shows that, like the other two groups, Group C achieved a mixture of results, albeit in a less dramatic way. The most notable of these results are those for C9 (a

difference of +3), described in section 5.4.3.2, and for C14 (a difference of -2.5), described in section 5.4.3.3.

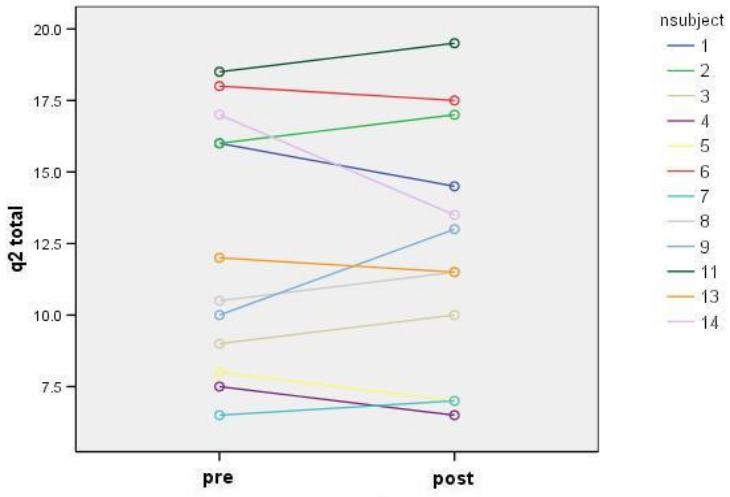


Figure 5.33. Question 2: Change pre-test to post-test by individual for Group C

5.4.3.2 Group C: Question 2(a)

Table 5.20 shows that C9 improved in the first and third melodies while the second melody maintained the same score from pre-test to post-test. The first melody in the pre-test was given a mostly accurate contour even though all except the first two notes were assigned incorrect pitch; in the post-test it was totally correct.

5.4.3.3 Group C: Question 2(b)

For subject C14 (see Table 5.21) the most obvious difference is that the second melody was totally correct in the pre-test whereas in the post-test only the first bar was accurate. Bars 2 and 4 were assigned incorrect pitch although the contour was correct (admittedly less closely in bar 4); the second bar did not give even the correct contour.

Table 5.20

Question 2: Scores for subject C9

	Maximum possible	Pre-test	Post-test
Question 2(a)	4.0	2.0	4.0
Question 2(b)	8.0	4.0	4.0
Question 2(c)	8.0	4.0	5.0
Question 2 total	20.0	10.0	13.0

Table 5.21

Question 2: Scores for subject C14

	Maximum possible	Pre-test	Post-test
Question 2(a)	4.0	4.0	4.0
Question 2(b)	8.0	8.0	4.5
Question 2(c)	8.0	5.0	5.0
Question 2 total	20.0	17.0	13.5

5.4.3.4 Group C: Question 2(c)

For C9, the third melody showed a slight improvement in the post-test (see Table 5.20): similar errors occurred in both tests, but the pitch was more accurately identified in the latter.

5.5.1 Results: Question Three

It will be observed from Figure 5.34 that Groups A and B made easily discernible progress in recognition of scales and modes, whereas Group C made very little progress.

The modes receive less obvious everyday use than scales in Western classical music and although they feature more frequently in the pop and rock idioms, they are rarely acknowledged or recognized. Question 3(b) presented a greater challenge to all three groups. The mean scores for Question 3(b) are lower in every instance than the corresponding means in Question 3(a), although the post-test mean for Group A comes closest to matching the relevant pre-test mean (see Tables 5.22 and 5.23).

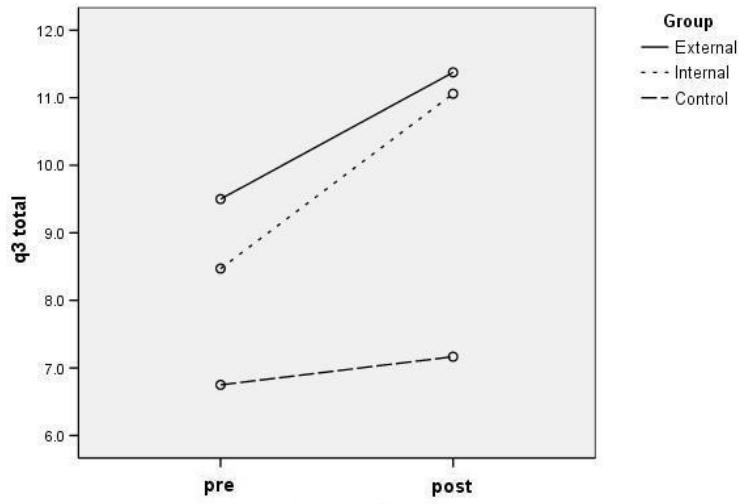


Figure 5.34. Question 3: Change pre-test to post-test by group

Tables 5.22 and 5.23 break down the results for scales and modes respectively. They also show that, despite the possible expectation that younger subjects might perform better with mode recognition than their older counterparts, such is not the case: the Group A means for mode recognition were higher in both pre-test and post-test than the Group B means, indicating that age was not a factor contributing to success for this skill.

Table 5.22

Question 3(a): Mean scores for all groups

Group A		**Group B**		**Group C**	
Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]
4.93	5.69	4.76	5.88	3.50	3.84
Difference:	+0.76	Difference	+1.12	Difference	+0.34

[1] maximum = 6.00

Table 5.23

Question 3(b): Mean scores for all groups

Group A		**Group B**		**Group C**	
Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]	Pre-test[1]	Post-test[1]
4.56	5.68	3.76	5.18	3.25	3.33
Difference:	+1.12	Difference:	+1.42	Difference:	+0.06

[1]maximum = 6.00

Nevertheless, the completed test papers revealed a lack of understanding with respect to scales and modes by some subjects, even after the training. A10, for example, identified the harmonic minor scale as *melodic* minor in both tests, and the wholetone scale was incorrectly identified as *dorian* in the pre-test and *aolian* [*sic*] in the post-test. A5 also exhibited the same misperception. A10, however, demonstrated a general weakness in aural work: this subject was the only one to exhibit a decline in performance for Question 1 (rhythm); s/he was one of only two not to achieve a full score for melody (a) in Question 2, and was poor at identifying intervals in context in the two other melodies; although registering a difference of +3 in scale and mode recognition in Question 3, the scores were lower than for the remainder of the group.

From an examination of Table 5.24 it can be seen that for all three groups, it was more challenging to match the pairs of modes than to match the more familiar scale pairs. In both the pre-test and post-test the range of scores for both scales and modes remained similar, with Groups A and B revealing something of a ceiling effect, but Group C performing at a lower level.

Table 5.24

Question 3(a): Identifying scale/mode pairs as the same or different

	Number correct	**Group A (n=16)**		**Group B (n=17)**		**Group C (n=12)**	
		Pre-test	**Post-test**	**Pre-test**	**Post-test**	**Pre-test**	**Post-test**
Scales	3	15	16	15	17	10	10
	2	-	-	1	-	2	2
	1	1	-	1	-	-	-
	0	-	-	-	-	-	-
	Total	**16**	**16**	**17**	**17**	**12**	**12**
Modes	3	13	15	13	15	8	8
	2	1	1	2	2	3	3
	1	2	-	2	-	-	-
	0	-	-	-	-	1	1
	Total	**16**	**16**	**17**	**17**	**12**	**12**

Table 5.25 shows that the pre-test naming of modes was less successful than for the scales; it also reveals a considerable improvement for Groups A and B in identifying modes accurately, but not for Group C.

Table 5.25

Question 3(b): Naming the second scale/mode of each pair

	Number correct	Group A (n=16)		Group B (n=17)		Group C (n=12)	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Scales	3	5	13	5	15	1	3
	2	7	1	8	2	2	1
	1	4	2	2	-	1	1
	0	-	-	2	-	8	7
	Total	**16**	**16**	**17**	**17**	**12**	**12**
Modes	3	5	13	3	8	-	-
	2	5	2	1	7	-	-
	1	5	1	8	1	9	10
	0	1	-	5	1	3	2
	Total	**16**	**16**	**17**	**17**	**12**	**12**

5.5.1.1 Question Three Total: Group A

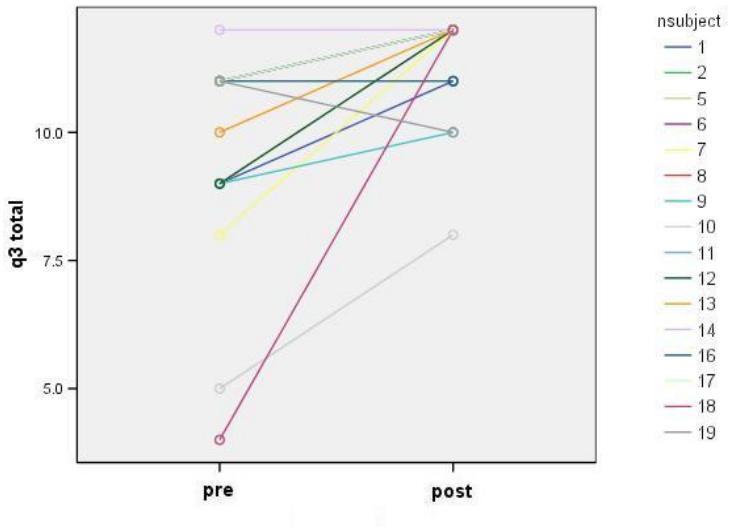


Figure 5.35. Question 3: Change pre-test to post-test by individual for Group A

Figure 5.35 shows that most of Group A performed well for the pre-test, and somewhat better on the post-test: a small ceiling effect is evident. The post-test represents a striking improvement: subjects could successfully recognise patterns of tones and semitones utilized in scales and modes as being the same or different, and were sufficiently familiar with these patterns to identify them with greater accuracy.

A18 showed the most noticeable improvement with a difference from pre-test to post-test of +8. A10 achieved a positive difference of +3, but with lower scores relative to the

remainder of Group A. Like A10, A5 and A12 also registered a difference of +3, but this did not represent so critical an improvement because the actual scores in both tests were rather higher than for A10: both A5 and A12 gained 9/12 for the pre-test and then a full score of 12/12 for the post-test.

A7 achieved a difference of +4, attaining 8/12 for this question in the pre-test, and a full score of 12/12 in the post-test.

5.5.1.2 Group A: Question 3(a)

Figure 5.36 and Table 5.26 reveal a strong ceiling effect; many students retained the same result for both pre-test and post-test, and all others except one showed a positive difference of +1 or +2. The one standing out most clearly is A18 who registered a greater positive difference of +4. Of those who registered the same score in both pre- and post-test, five achieved a full score both times; A1 achieved 5/6 with identical answers both times; and A9 and A10 achieved 4/6 both times, although with slightly different answers in each test.

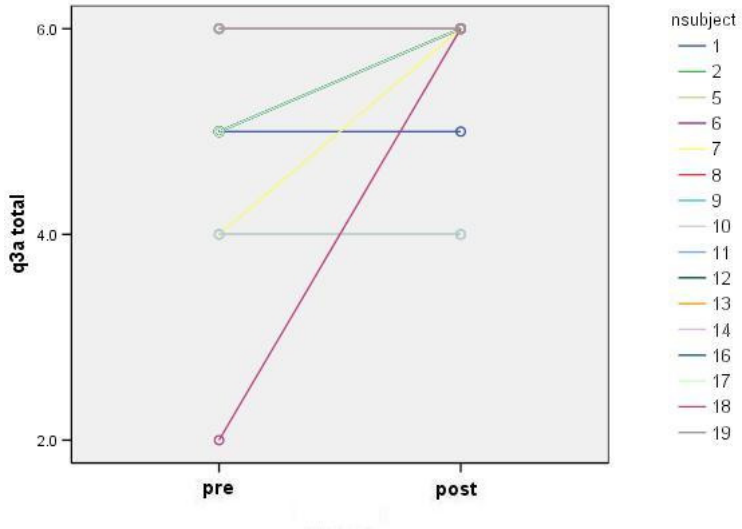


Figure 5.36. Question 3(a): Change pre-test to post-test by individual for Group A

A9 correctly identified all scale pairs as different in both tests, but in the pre-test identified only the first scale accurately, and in the post-test only the second scale. In the pre-test the second scale was identified as “phrygian” and the third as “lydian” (albeit that these are names of modes rather than scales), whereas in the post-test the first scale was named as

"*natural* minor" rather than harmonic minor, and the third scale again as "lydian" (see Appendix F2 for the correct answers for Question 3).

In the pre-test A10 scored 4/6 in part (a), achieving a total of 5/12 for Question 3. In part (a) this subject correctly identified all scale pairs as different, but identified only the second scale accurately. In the post-test A10 again scored 4/6 in part (a), giving correct responses to the same questions as in the pre-test; the first scale was identified incorrectly both times as melodic minor (instead of harmonic minor) whereas the third scale was identified as "dorian" in the pre-test and "aolian" [*sic*] in the post-test (instead of wholetone scale). The fact that A10 gave the name of a mode in part (a) which deals only with scales indicates a certain lack of understanding of the question on the part of this subject.

Table 5.26
Question 3(a): Change pre-test to post-test by individual for Group A

Subject (n=16)	Pre-test[1]	Post-test[1]	Difference
1	5.0	5.0	= 0.0
2	5.0	6.0	+ 1.0
5	5.0	6.0	+ 1.0
6	5.0	6.0	+ 1.0
7	4.0	6.0	+ 2.0
8	6.0	6.0	= 0.0
9	4.0	4.0	= 0.0
10	4.0	4.0	= 0.0
11	6.0	6.0	= 0.0
12	5.0	6.0	+ 1.0
13	6.0	6.0	= 0.0
14	6.0	6.0	= 0.0
16	5.0	6.0	+ 1.0
17	5.0	6.0	+ 1.0
18	2.0	6.0	+ 4.0
19	6.0	6.0	= 0.0

[1] maximum = 6.0

In part (a) of Question 3 in the pre-test, the only error made by A5 was to identify the final scale as lydian (rather than as wholetone). Giving the name of a mode rather than a scale here indicates a similar misunderstanding to that of A10 for this task.

A12, like A5, was correct for all of part (a) except for identifying the third scale, which the subject named "mode", showing once again the strange misunderstanding shared by A5 and A10.

In the pre-test, A7 achieved 4/6 for part (a); all scale pairs were correctly named as the same or different, while only the second scale was correctly identified. The first scale was identified only as "minor" without specifying which type of minor scale and therefore did not receive a mark, but the third scale was left blank.

In Group A only one subject (A18) failed to identify all three scale pairs in the pre-test as being the same or different; in the post-test all pairs were identified correctly. Subjects were less capable of identifying correctly the second scale in the pair. In the pre-test only five subjects identified all three scales correctly, seven identified two scales correctly, and four identified only one scale accurately; the post-test, however, showed a considerable improvement, with 13 subjects identifying all three scales with accuracy, one subject accurately naming two scales, and two subjects correctly identifying one scale.

5.5.1.3 Group A: Question 3(b)

In the pre-test, A10 scored 1/6 in part (b), achieving a total of 5/12 for Question 3. In part (b) of the pre-test, A10 identified only the second mode pair correctly as the same or different, and none of the modes is identified – the spaces are left blank as instructed if the name is not known – to give a result of 1/6; in the post-test, however, a score of 4/6 was gained, giving a total of 8/12 for this question. In the post-test all mode pairs (instead of only one pair) were correctly identified as the same or different, and an attempt was made to identify the first two modes while the third one was left blank. Of these two, the first was correctly identified as dorian, and the second one incorrectly as lydian. The fact that the modes in the first pair are the same, and the first mode is always given as dorian, it is natural that the subject should correctly name the second mode. Thus, the real progress here for A10 was that after instruction, s/he was now sufficiently familiar with the modes to recognise the patterns of tones and semitones as the same or different; even though s/he correctly identified the first mode, this does not necessarily indicate an improvement in actually identifying which pattern of tones and semitones was heard.

In part (b) in the pre-test, only the first mode pair was correctly identified as the same or different by A18; mode (iii) was incorrectly identified as mixolydian whereas (i) and (ii) were left blank, as subjects were instructed to do if the correct answer was not known. All responses for this question in the post-test were correct.

For subject A5, in part (b) in the pre-test, only the first mode was incorrect, the pair being identified as different rather than the same, and the space for identification left blank. Like A18, all responses for this question in the post-test were correct.

Similarly, A12 scored a maximum result for part (b) in the post-test; in the pre-test all mode pairs were correctly named as the same or different (in contrast to A5), but only the first mode was correctly identified – albeit the natural consequence of having identified this pair as the same.

In the pre-test in part (b), all mode pairs were likewise correctly identified by A7 as the same or different; but unlike A12, this time blank spaces were left for all three rather than identifying them. A7 achieved a maximum score for part (b) in the post-test.

A19 was the only member of the group to record a negative difference. For this subject, part (a) of the question in the post-test was completely correct, as in the pre-test; but two errors occurred in part (b). On this occasion, the third mode was correctly named as lydian, but the first mode pair was identified as being different rather than the same, and named as aeolian rather than dorian. This indicates a continuing lack of security in mode identification. A19 was a male guitarist aged 37 who had had only one year and 6 months' tuition, and one year and two months' tuition for his secondary instrument, the violin. He was the only subject in the study to be cross-institutionally enrolled in *Music Craft1*.

5.5.2.1 Question Three Total: Group B

Figure 5.37, illustrating the results for Question 3 for Group B, indicates a similar trend to that for Group A; that is, a certain ceiling effect was detected, and although most subjects achieved a positive difference from pre-test to post-test, a small selection of subjects shows a more marked positive difference than the others (B12 [+9], B4, B19 [+5], B2, B9, B14 [+4]). Only one subject registered a negative difference (B7 [-1]). B12 achieved a striking positive difference of +9, a similar magnitude of improvement to A18. Such results are supported by Figure 5.34 which reveals the rate of improvement for Group B as higher than that for Group A.

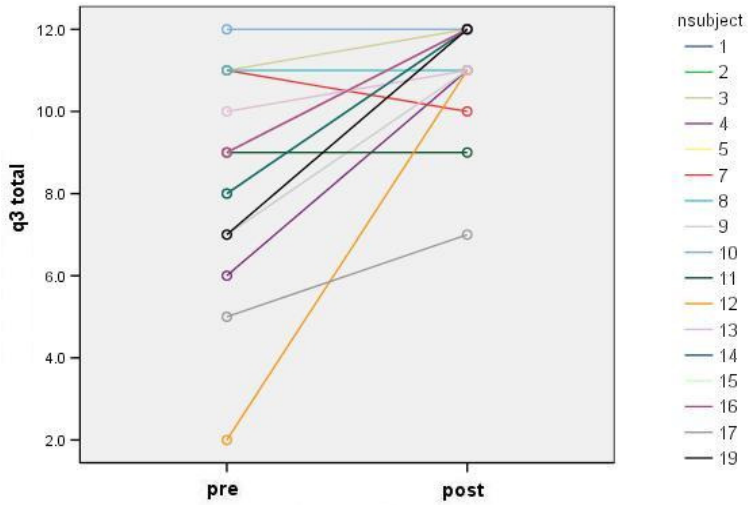


Figure 5.37. Question 3: Change pre-test to post-test by individual for Group B

5.5.2.2 Group B: Question 3(a)

The graph for Group B (Figure 5.38) again has a somewhat similar appearance to that for Group A (Figure 5.38); all except one subject registered no difference or else a small difference of +1 or +2. The exception is B12 who registered a difference of +5.

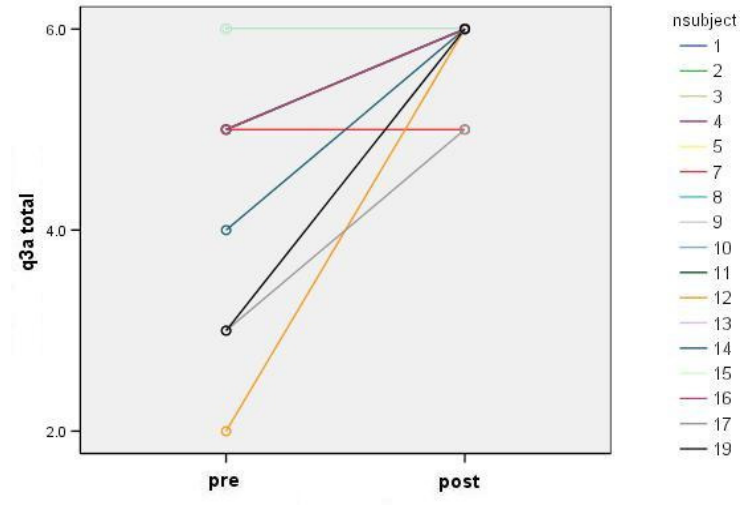


Figure 5.38. Question 3(a): Change pre-test to post-test by individual for Group B

All except two subjects in this group correctly identified all scale pairs as being the same or different. Of those two, one accurately identified two scale pairs as the same or different, and the other identified only one pair correctly; in the post-test these two subjects identified all pairs correctly, enabling a 100% success rate for this group for Question 3(a). Identification of the second scale of each pair was, as for Group A, less successful. In the pre-test five subjects (29.41%) accurately identified all three scales, whereas eight (47.05%) identified two scales, two (11.76%) identified only one scale, and another two (11.76%) failed to identify any of the scales accurately – a poorer result than for Group A. Post-test performance for Group B showed considerable improvement, however: whereas six of the subjects (35.3%) maintained the same score as formerly, 11 of the cohort (64.7%) improved their score. Thus, 15 identified all three scales correctly and the other two identified two scales correctly.

In the pre-test, B2 gave correct responses for part (a) except for leaving the name of the third scale blank. In the post-test the score for B2 for part (a) improved from 5/6 to 6/6. B9 performed identically to B2 for part (a) in both the pre-test and post-test.

B14's pre-test performance in part (a) was similar to B2 and B9, but only the second scale was correctly identified; the first was identified only as "minor" and was therefore awarded no mark, and the third was left with a blank space. B14's score for part (a) improved from 4/6 to 6/6 in the post-test.

In part (a) of this question in the pre-test, B12 correctly identified only the first scale pair as the same or different, and only the second scale was named correctly (as "cromatic" [*sic*]), while the third space was left blank. The first scale was identified as melodic minor rather than harmonic minor. In the post-test, by contrast, part (a) was completely correct.

In the pre-test, B19 correctly identified the first and third scale pairs as different, but the second pair was incorrectly shown as being the same. The first scale was accurately named, but the other two were not; rather, nonsensical names were provided, indicating perhaps a poor theory background: the second was identified as "chromatic major" [*sic*], so that even though the chromatic nature of the harmonic minor scale was recognised, it was scored as incorrect; and the final scale was identified as "augmented major". B19 achieved a full score of 6/6 for part (a) in the post-test.

5.5.2.3 Group B: Question 3(b)

In the pre-test, B2 failed to recognise the first mode pair as the same, and consequently named it wrongly, also leaving the name of the third mode blank. B14 nominated all mode pairs correctly as the same or different; but whilst the first mode was correctly named, the other two were left blank. In the post-test, B2 and B14 achieved full marks for part (b), improving from 3/6 and 4/6 respectively.

B4 achieved a score of only 1/6 for part (b) in the pre-test. This single mark was achieved through correct identification of the first mode pair as the same; however, this mode was incorrectly named as "natural minor". This is the reverse of the problem encountered in the responses of several other subjects whereby this mode pair was correctly identified as the same; but, where one would expect as a natural consequence that the mode would be accurately identified as dorian, the space where the mode should be named was left blank. The score for B4 for part (b) in the post-test improved to 5/6, the only error recorded on this occasion being the incorrect identification of the final mode as mixolydian rather than lydian.

B7 was the only subject in the internal group to register a negative difference, caused by falling in part (b) from a pre-test score of 6/6 to 5/6 in the post-test. Here the final mode, which had been correctly named in the pre-test, was not identified (i.e., the space was left blank).

B9 achieved a pre-test score of only 2/6 for part (b): this subject identified the first mode pair incorrectly as different, and all the modes were wrongly identified, the second by means of a blank space, and the other two with incorrect names. B9 achieved 5/6 in the post-test; the only error, as for some other subjects who have come under discussion, was the incorrect identification of the final mode as mixolydian rather than lydian.

Only the final mode pair was identified by subject B12 as the same or different in the pre-test, and all three spaces for naming the modes were left blank; but in the post-test the only error was to name the third mode as mixolydian instead of lydian.

Although receiving the maximum score for both parts of Question 3 in the post-test, B19 achieved a total of 7/12 for Question 3 in the pre-test, that is, 3/6 for part (a) and 4/6 for part (b). The result for modes was better than for scales, this being different from the usual case; however, this subject's responses in naming the scales and modes appear not to indicate a superior knowledge in the latter over the former (see the reference to B19 in section 5.5.2.2). In part (b) all mode pairs were accurately recognised as the same or different, but the second and third modes were incorrectly named; the first was left blank. By contrast, full

marks were awarded for both parts in the post-test, indicating an improvement both in identifying pairs of scales and/or modes as the same or different, and in accurately recognising and naming the patterns of tone and semitones peculiar to each scale and mode.

5.5.3.1 Question Three Total: Group C

Figure 5.39 indicates a much wider range of differences for the control group than for Groups A and B, with four (33.3%) of the group maintaining the same score for both pre-test and post-test, five (41.6%) achieving a positive difference and three (25.1%) showing a negative difference.

As indicated in Figure 5.39, only C14 showed a marked improvement, with a difference of +5. C2 and C6 achieved a difference of +3, the same increase as several subjects in Groups A and B. It is for this reason that these two subjects could not be said to have made a *significant* improvement between tests. For both C2 and C6, the major reason for improvement was that in the post-test the first mode pair was recognised as being the same, and consequently correctly named.

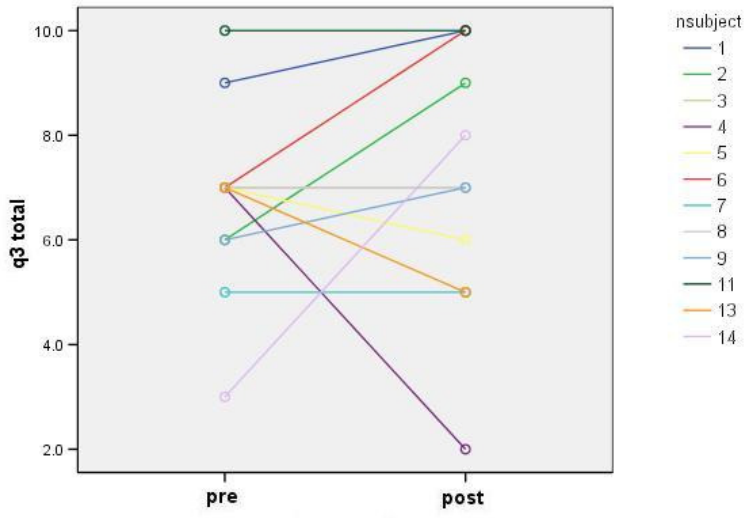


Figure 5.39. Question 3: Change pre-test to post-test by individual for Group C

5.5.3.2 Group C: Question 3(a)

Group C registered a similar profile to the other two groups for Question 3(a) (compare Figure 5.40 with Figures 5.36 and 5.38) in that all subjects except one registered a difference of 0 (zero) or +1; the exception was C4 who was the only subject to register a negative difference (-1).

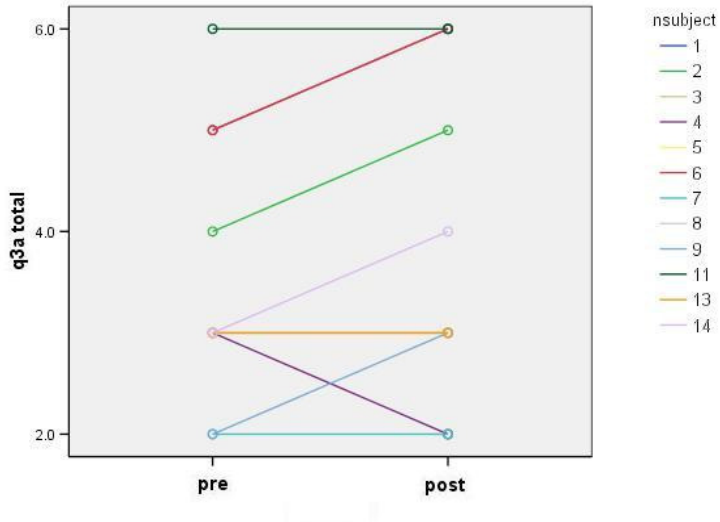


Figure 5.40. Question 3(a): Change pre-test to post-test by individual for Group C

Group C performed poorly for scale identification, as shown in Table 5.27.

Table 5.27

Question 3(a): Scale identification for Group C

	Number correct	(n=12)	
		Pre-test	Post-test
Is the scale pair the same or different?	3	10	10
	2	2	2
	1	-	-
	0	-	-
	Total	**12**	**12**
Identify the second scale of the pair	3	1	3
	2	2	1
	1	1	1
	0	8	7
	Total	**12**	**12**

In the pre-test, 10 of the 12 subjects correctly identified all three scale pairs as the same or different (the other two – C7 and C9 – identified two scale pairs accurately); for the post-test, likewise only two subjects (this time C4 and C7) accurately identified two scale pairs rather than three. Some difficulty was experienced in correctly naming the second scale of each pair: in the pre-test the only responses given by C14 were to identify correctly the three scale pairs as different and everything else remains blank, whereas in the post-test one of the scales was additionally correctly named. Table 5.27 reports very little improvement for the group as a whole.

5.5.3.3 Group C: Question 3(b)

A comparison of Tables 5.27 and 5.28 show that performance by Group C in part (b), the mode identification, was similar although less varied than for part (a).

Table 5.28

Question 3(b): Mode identification for Group C

	Number correct	(n=12)	
		Pre-test	Post-test
Is the mode pair the same or different?	3	8	8
	2	3	3
	1	-	-
	0	1	1
	Total	**12**	**12**
Identify the second mode of the pair	3	-	-
	2	-	-
	1	9	10
	0	3	2
	Total	**12**	**12**

C14 was the only member of this group to register a significant overall improvement in Question 3, largely as a result of performance in part (b) (see Table 5.29). In the pre-test, this subject correctly identified the mode pairs as the same or different. The improvement was a direct result of an attempt in the post-test to identify the scales and modes rather than to leave the spaces blank.

Table 5.29

Question 3: Scores for subject C14

	Maximum possible	Pre-test	Post-test
Question 3(a)	6.00	3.00	4.00
Question 3(b)	6.00	0.00	4.00
Question 3 total	12.00	3.00	8.00

5.6.1 Results: Question 4

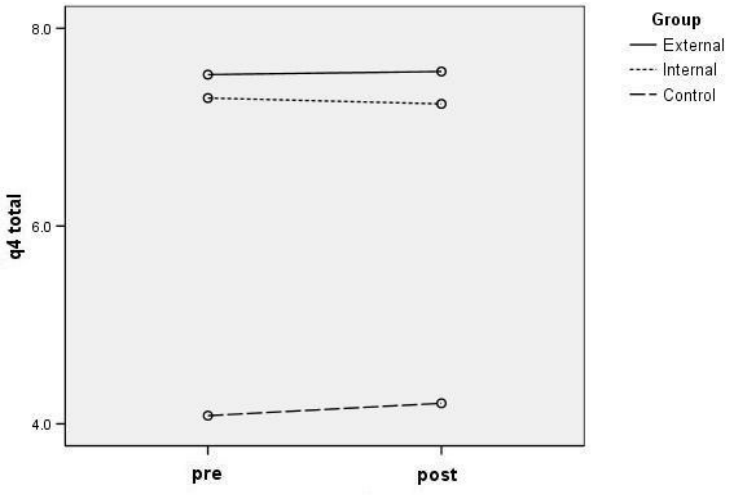


Figure 5.41. Question 4: Change pre-test to post-test by group

None of the groups registered any significant change in interval recognition, as shown by Figure 5.41 and Tables 5.30 and 5.31. Given Shatzkin's (1981a) concerns about acontextual interval recognition, this result could be considered unsurprising. Group A maintained the *status quo*, while Group B showed a small decline in performance and Group C a small improvement in performance. Despite this increase by Group C as a whole, the results recorded by the individual members of the group were generally far lower than those recorded by individual members of Groups A and B. Looking at the group summaries, it appears that a strong ceiling effect is in operation; however, much more variety is apparent when scrutinizing the individual performance within the groups for Question 4(b).

Table 5.30
Question 4(a): comparing interval pairs, all groups

	Number correct	Group A (n=16)		Group B (n=17)		Group C (n=12)	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Is the interval pair the same or different?	3	16	16	17	17	8	9
	2	-	-	-	-	3	1
	1	-	-	-	-	-	1
	0	-	-	-	-	1	1
	Total	**16**	**16**	**17**	**17**	**12**	**12**
Is the second interval wider?	3	16	16	17	17	8	8
	2	-	-	-	-	3	1
	1	-	-	-	-	-	1
	0	-	-	-	-	1	2
	Total	**16**	**16**	**17**	**17**	**12**	**12**

Table 5.31
Question 4(b): Identifying intervals, all groups

	Number correct	Group A (n=16)		Group B (n=17)		Group C (n=12)	
		Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
Give the quality and size of the intervals	5.0	11	12	7	5	2	1
	4.5	1	1	2	4	-	-
	4.0	1	-	5	3	1	2
	3.5	1	1	1	4	1	1
	3.0	1	1	1	1	-	-
	2.5	1	-	1	-	-	1
	2.0	-	1	-	-	-	1
	1.5	-	-	-	-	1	-
	1.0	-	-	-	-	-	1
	0.5	-	-	-	-	-	-
	0.0	-	-	-	-	7	5
	Total	**16**	**16**	**17**	**17**	**12**	**12**

5.6.1.1 Question Four Total: Group A

One would anticipate from the final comment of section 5.6.1 to find most subjects in Group A to register little or no difference; the expectation is confirmed. Of the 16 subjects in this group, 11 (68.75%) register a difference of zero, two subjects (12.5%) a difference of +0.5, and two subjects (12.5%) a difference of -1.5 – all representing an insignificant change

Table 5.32
Question 4: Change pre-test to post-test by individual for Group A

Subject (n=16)	Pre-test[1]	Post-test[1]	Difference
1	5.50	8.00	+2.50
2	8.00	8.00	=0.00
5	8.00	8.00	=0.00
6	8.00	8.00	=0.00
7	8.00	8.00	=0.00
8	8.00	8.00	=0.00
9	8.00	8.00	=0.00
10	7.50	6.00	-1.50
11	8.00	8.00	=0.00
12	8.00	8.00	=0.00
13	8.00	8.00	=0.00
14	8.00	8.00	=0.00
16	8.00	8.00	=0.00
17	7.00	7.50	+0.50
18	6.50	5.00	-1.50
19	6.00	6.50	+0.50
Mean	7.53	7.56	+0.30

[1] maximum = 8.00

in performance. A single subject, A1 (6.25%), registers a noticeably larger difference of +3. A10 and A18 registered a small negative difference, and it should be noted that they also experienced difficulty with important intervals in melodic context in Question 2 (see section 5.4.1). The 11 subjects registering no difference all achieved the maximum possible score in both the pre-test and post-test, giving rise to a strong ceiling effect that compromises the power of the question to reveal any useful statistic (see Table 5.32). This will be discussed in greater detail in chapter 6.

5.6.1.2 Group A: Question 4(a)

In Question 4(a), in which subjects are required firstly to judge for three pairs of intervals whether each pair is the same or different, and secondly to state whether the second interval of each pair is wider, all subjects in Group A achieved the maximum score in both pre-test and post-test.

5.6.1.3 Group A: Question 4(b)

Raw scores for Group A for this question are shown in Table 5.33.

Table 5.33
Question 4(b): Change pre-test to post-test by individual for Group A

Subject (n=16)	Pre-test[1]	Post-test[1]	Difference
1	2.50	5.00	+2.50
2	5.00	5.00	=0.00
5	5.00	5.00	=0.00
6	5.00	5.00	=0.00
7	5.00	5.00	=0.00
8	5.00	5.00	=0.00
9	5.00	5.00	=0.00
10	4.50	3.00	-1.50
11	5.00	5.00	=0.00
12	5.00	5.00	=0.00
13	5.00	5.00	=0.00
14	5.00	5.00	=0.00
16	5.00	5.00	=0.00
17	4.00	4.50	+0.50
18	3.50	2.00	-1.50
19	3.00	3.50	+0.50
Mean	**4.53**	**4.56**	**+0.03**

[1] maximum = 5.00

For Question 4(b), in which subjects were required to identify the quality and size of five different intervals, subject A1 achieved only 2.5/5 in the pre-test, but then 5/5 in the

post-test. In the pre-test two of the intervals were the correct size but the wrong quality (minor 3rd instead of major 3rd, and minor 2nd instead of major 2nd) and one was wrong in both respects (minor 6th instead of major 7th).

A17 and A19 each achieved the small positive difference of +0.5. Both achieved the maximum for part (a); the improvement for both occurred in the accurate identification of intervals.

In the pre-test, A17 made the same two errors as A1 (see above); in the post-test both of these errors were corrected, but a new error was introduced by identifying the final interval as a minor 7th rather than a major 7th.

In the pre-test A19 identified the first interval as a minor rather than a major 3rd, the second interval as a perfect 5th rather than a major 6th, and the final interval as a minor rather than a major 7th; in the post-test these were identified respectively as minor 3rd (again), major 6th (correctly) and augmented 4th (totally incorrect).

A10 and A18 both recorded a negative difference, -1.5. Like A17 and A19, they both achieved the maximum for part (a), the diminished performance resulting from the inaccurate identification of the intervals in part (b).

A10 scored 4.5/5 in part (b) in the pre-test, the only error being the identification of the final interval as a minor rather than a major 7th. Several additional errors were made in the post-test: the first interval was named as a minor rather than a major 3rd, and the second interval as a perfect octave rather than a major 6th.

A18 scored 3.5/5 for part (b) in the pre-test, identifying the first interval as an augmented 4th rather than a major 3rd, and the final interval as a minor rather than a major 7th. In the post-test, s/he again identified the first interval incorrectly, but this time as a major 2nd; the second interval was wrongly named as a perfect 5th, and the final interval totally incorrect as an augmented 4th.

5.6.2.1 Question Four Total: Group B

Figure 5.42 indicates that for Group B, performance for the whole of Question 4 shows a similar trend to Group A, although the ceiling effect is slightly less strong and the group registers overall a small decline in performance in interval recognition. Of the 17 subjects in this group, nine (52.9%) show no difference, achieving a score of either 7, 7.5 or 8 (possible maximum = 8). Two (11.7%) show a difference of +0.5, three (17.6%) a difference

of -0.5, one (5.8%) of -1.0, one (5.8%) of -1.5, and a further one (5.8%), B1, a more noticeable difference of +2.0. Table 5.34 shows the raw scores for Group B.

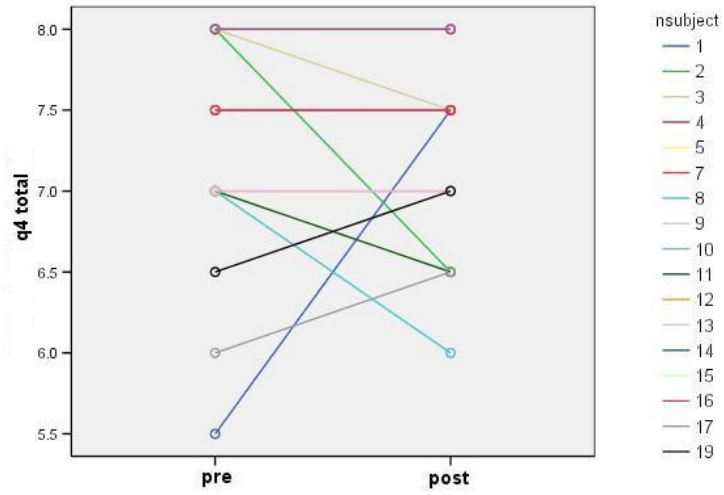


Figure 5.42. Question 4: Change pre-test to post-test by individual for Group B

5.6.2.2 Group B: Question 4(a)

All Group B subjects achieved the maximum result in both the pre-test and the post-test. This ceiling effect will be discussed in chapter 6.

Table 5.34
Question 4: Change pre-test to post-test by individual for Group B

Subject (n=17)	Pre-test[1]	Post-test[1]	Difference
1	5.50	7.50	+ 2.00
2	8.00	6.50	- 1.50
3	8.00	7.50	- 0.50
4	7.50	7.50	= 0.00
5	7.00	6.50	- 0.50
7	7.50	7.50	= 0.00
8	7.00	6.00	- 1.00
9	8.00	8.00	= 0.00
10	8.00	8.00	= 0.00
11	7.00	6.50	- 0.50
12	7.00	7.00	= 0.00
13	7.00	7.00	= 0.00
14	8.00	8.00	= 0.00
15	8.00	8.00	= 0.00
16	8.00	8.00	= 0.00
17	6.00	6.50	+ 0.50
19	6.50	7.00	+ 0.50
Mean	**7.29**	**7.23**	**-0.08**

[1] maximum = 8.00

5.6.2.3 Group B – Question 4(b)

Group B overall recorded a decreased performance (see Table 5.35) in interval identification in Question 4(b), with nine subjects achieving the same score on both tests, five showing a negative difference, and three showing a positive difference. The largest differences were achieved by B1 (+2.0) and B2 (-1.5).

For B1, the errors in both the pre-test and post-test occurred in part (b). In the pre-test the first interval was incorrectly named as a diminished 5th rather than major 3rd; the second interval was identified as a major 7th rather than a major 6th; the final interval, as for many others who named this interval wrongly, was named as a minor 7th rather than a major 7th. In the post-test, the only error for part (b) was for the third interval: this had been named correctly in the pre-test as a major 2nd, but in the post-test was identified as a minor 2nd.

Table 5.35

Question 4(b): Change pre-test to post-test by individual for Group B

Subject (n=17)	Pre-test[1]	Post-test[1]	Difference
1	2.50	4.50	+2.00
2	5.00	3.50	-1.50
3	5.00	4.50	-0.50
4	4.50	4.50	=0.00
5	4.00	3.50	-0.50
7	4.50	4.50	=0.00
8	4.00	3.00	-1.00
9	5.00	5.00	=0.00
10	5.00	5.00	=0.00
11	4.00	3.50	-0.50
12	4.00	4.00	=0.00
13	4.00	4.00	=0.00
14	5.00	5.00	=0.00
15	5.00	5.00	=0.00
16	5.00	5.00	=0.00
17	3.50	3.50	+0.50
19	4.00	4.00	+0.50
Mean	**4.08**	**3.82**	**-0.26**

[1] maximum = 5.00

B2 showed the greatest negative difference in this group, -1.5. Once again the errors occur in part (b): in the pre-test this part was entirely correct, but in the post-test the second interval was named as a perfect 5th instead of a major 6th, and the third interval named (like B1) as a minor rather than a major 2nd.

5.6.3.1 Question Four Total: Group C

Group C registered a small overall improvement in performance in interval recognition (see Figure 5.43). Only four of the 12 subjects (33.3%) show a difference of zero, while five (41.7%) show a negative difference (two of -1.0, two of -1.5 and one of -2.0), and three (25%) show a positive difference one of +1.0, one of +2.0 and one of +5.5.

The extraordinary positive difference of C14 is the greatest (and likely single) contributing factor to the positive difference registered by the group overall.

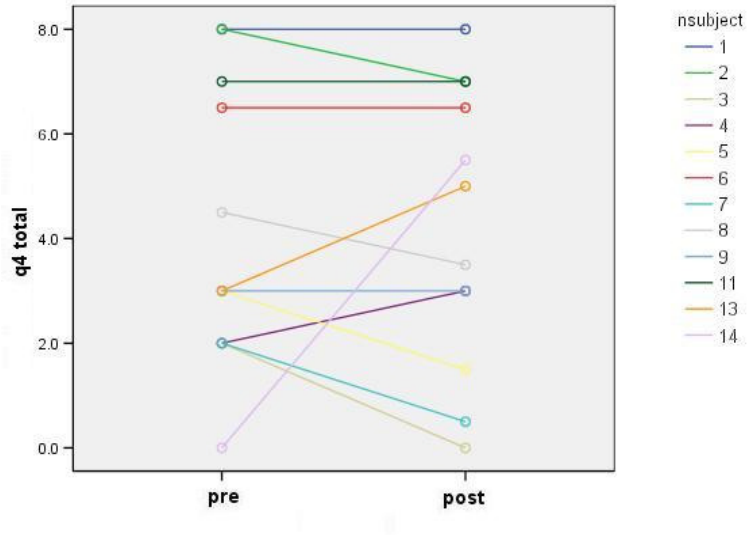


Figure 5.43. Question 4: Change pre-test to post-test by individual for Group C

5.6.3.2 Group C: Question 4(a)

The means shown in Table 5.36 reveal a small decrease in performance. Six subjects in the group had maintained the same score (the maximum score of 3/3) for Question 4(a) in both tests, indicating a strong ceiling effect. Two subjects improved their score and four subjects performed less well in the post-test.

The two who improved were C4 and C14. In the pre-test C4 incorrectly identified the second interval pair as the same and failed to indicate (by circling *Yes* or *No*) whether the second interval was wider, whereas both of these were correctly answered in the post-test. C14 made an improvement of +3.0 which appears impressive; but the cause is that in the pre-test this subject did not attempt Question 4.

Table 5.36

Question 4(a): Change pre-test to post-test by individual for Group C

Subject (n=12)	Pre-test[1]	Post-test[1]	Difference
1	3.00	3.00	=0.00
2	3.00	3.00	=0.00
3	2.00	0.00	-2.00
4	2.00	3.00	+1.00
5	3.00	1.50	-1.50
6	3.00	3.00	=0.00
7	2.00	0.50	-1.50
8	3.00	2.50	-0.50
9	3.00	3.00	=0.00
11	3.00	3.00	=0.00
13	3.00	3.00	=0.00
14	0.00	3.00	+3.00
Mean	**2.50**	**2.37**	**-0.13**

[1] maximum = 3.00

By contrast, C3, C5, C7 and C8 recorded a decreased performance in the post-test. In the post-test, C3 incorrectly identified the second interval pair as the same and failed to indicate (by circling *Yes* or *No*) whether the second interval was wider. In the post-test s/he incorrectly identified all three interval pairs as the same, although there is evidence on the answer paper that the second pair had initially been correctly identified as different; a faint ring appears around the word *Different*, showing this answer had been circled and then the circle erased. The same applies to the word *Yes* to indicate the second interval of the pair had been wider, revealing a poor understanding of the relevant concepts by this subject, who furthermore had not attempted to identify this aspect of the first and third interval pairs.

C5 achieved a full score for Question 4(a) in the pre-test, but made some errors in the post-test. The first interval pair was incorrectly identified as being the same, and no attempt was made to answer whether the second interval was wider (by circling *Yes* or *No*). The second interval pair was correctly identified as being different, but the subject answered incorrectly that the second interval of the pair was wider.

In the pre-test C7 answered with the same faults as C3 and C4: in the post-test the second interval pair was correctly identified as different, but the second interval in the pair was wrongly identified as being the wider of the two. The first and second interval pairs were both incorrectly observed as the same, and no attempt was made to answer whether the second interval in each pair was wider.

Like C5, C8 achieved the maximum score for Question 4(a) in the pre-test; in the post-test the only error was to identify the second interval in the first pair as narrower (by circling *No*).

Table 5.37 shows that for Question 4(b), only two members of Group C registered a positive difference from pre-test to post-test; two members registered a negative difference, and the remaining eight registered no difference. The group mean also registered a small negative difference. Given that this was the group that received no instruction between the two tests, it would be reasonable to predict that the group and individual differences would be zero or very close to zero.

5.6.3.3 Group C: Question 4(b)

Table 5.37

Question 4(b): Change pre-test to post-test by individual for Group C

Subject (n=12)	Pre-test[1]	Post-test[1]	Difference
1	5.0	5.0	=0.0
2	5.0	4.0	-1.0
3	0.0	0.0	=0.0
4	0.0	0.0	=0.0
5	0.0	0.0	=0.0
6	3.5	3.5	=0.0
7	0.0	0.0	=0.0
8	1.5	1.0	-0.5
9	0.0	0.0	=0.0
11	4.0	4.0	=0.0
13	0.0	2.0	+2.0
14	0.0	2.5	+2.5
Mean	**1.58**	**1.83**	**+0.25**

[1] maximum = 5.00

Of the eight who registered no difference, five achieved a score of zero for Question 4(b) in both tests. Of these, C3, C4, C5 and C7 made no attempt in either test to answer the question. C9 attempted only the second interval in the pre-test, incorrectly named as a perfect 5th; in the post-test no attempt was made to answer, although s/he wrote "No idea!" in the margin.

The other three who registered no difference scored as follows: C1 achieved the maximum of 5/5 in both tests, C6 achieved a score of 3.5/5, and C11 achieved 4/5.

The negative differences, scored by C2 and C8, were only small. C2 achieved a maximum score in the pre-test, but in the post-test identified the second interval (major 6th) inaccurately as a perfect 5th.

C8 achieved 1.5/5 in the pre-test. Although s/he did not know the musical terminology needed to answer this question successfully, this student made an attempt to answer by writing "4 notes higher", "6 notes higher" and so on. S/he consequently received a half mark for each of three intervals for which the size was accurately identified, that is, (ii), (iv) and (v). In the post-test C8 answered mostly with terminology such as "third", and a half mark was received for (i) and (iv). The latter had been named as "8 notes higher" in the pre-test, and "one octave higher" in the post-test, which indicates some private learning had taken place between tests, although not necessarily of a formal kind. C8 did not attempt to identify the quality for any of the intervals in either test.

The positive differences, achieved by C13 and C14, were somewhat larger in size than the negative differences and consequently something of a surprise. C13 was a female pianist, 18 years and 11 months at the time of the pre-test, who had had five years' tuition and achieved a Grade 2 qualification and played no second instrument. C14 was a female pianist, 19 years and nine months at the time of the pre-test, who had eight years' tuition and achieved a Grade 8 qualification, and whose second instrument was the violin, for which three years' tuition had been received and no qualification gained.

There do not appear to be any major demographic differences between C13 and C14 and the remainder of Group C. This group had three other pianists; there were three other 19-year-old subjects, another one who was 18, and one aged 20; of the seven other subjects in this group who had gained an exectutant qualification, two achieved Grade 3, one achieved Grade 5, and two achieved Grade 6; of the ten other subjects in the group, four had experience with a secondary instrument and six did not.

C13 made no attempt to identify the intervals in the pre-test; in the post-test, however, s/he gave answers using the usual terminology, although (iv) was named only as "Octave" and (v) as a "minor 4^{th}".

For Question 4(b), C14 also made no attempt in the pre-test, but in the post-test had intervals (ii) and (iii) correctly named, and interval (iv) identified with the correct size but the wrong quality: the first interval was identified only a semitone too wide as a perfect 4^{th} rather than major 3^{rd}; the fourth interval was named as an "octave – major" which indicates an unfamiliarity with the usual terminology; and the final interval was named as "octave – minor" rather than a major 7^{th}.

5.7 Results: Self-rating

5.7.1 General Approach

The differences between the pre-test and post-test scores have been compared with the differences between the pre-test and post-test self-ratings for the four areas of rhythm, melody, scale/mode recognition, and interval recognition. The self-ratings were measured on a five point Likert scale; each point was given a numerical value in order to measure the difference from pre-test to post-test. If the subject self-rated at the time of the pre-test as "poor", but at the time of the post-test as "good", the difference would be measured as +2; or if the pre-test self-rating was "very good" and the post-test self-rating was "good", then the difference would be measured as -1. The numeric self-rating differences and the score differences were compared for correlation; the combinations of comparison have been separated out to 13 possibilities (an overview of these comparisons can be seen in Table 5.38):

1. both the self-rating and the score differences move positively in the same direction
   (i) by the same amount;
   (ii) where the score is higher than the self-rating;
   (iii) where the score is lower than the self-rating;
2. both the self-rating and the scores differences move negatively in the same direction
   (i) by the same amount;
   (ii) where the score is higher than the self-rating;
   (iii) where the score is lower than the self-rating;
3. the self-rating and the scores differences move in opposite directions
   (i) the score difference measure is higher than for the self-rating;
   (ii) the self-rating difference measure is higher than for the score;
4. both the self-rating and score measures remain the same;
5. the self-rating difference measure remains the same
   (i) but the score difference is positive;
   (ii) but the score difference is negative;
6. the score difference measure remains the same
   (i) but the self-rating difference is positive;
   (ii) but the self-rating difference is negative.

For Question 1, the rhythmic dictation, the most common condition when taking all groups together was for subjects to rate themselves the same at the beginning and the end of the study, but for their score to increase; next was for the self-rating and the score to move in opposite directions but the score difference measure is higher than for the self-rating. In Group A, the second most prominent condition was for the score and the self-rating both to move in a positive direction; however, it would appear that even though improvement clearly took place in both Groups A and B, the lack of confidence in one's own ability which was suggested (Radocy, 1975) to be perhaps the primary reason for erroneous response was a common trait amongst subjects.

Table 5.38

Self-rating differences compared with score differences

Question	**Group**	**Same direction (+)**			**Same direction (-)**			**Opposite direction**		**Both the same**	**Same self-rating**		**Same score**		**Total**
		Same amount	**Higher self-rating**	**Higher score**	**Same amount**	**Higher self-rating**	**Higher score**	**Higher self-rating**	**Higher score**		**Score +**	**Score -**	**Self-rating +**	**Self-rating -**	
Q1	A	-	-	5	-	1	-	-	2	-	8	-	-	-	n=16
	B	-	-	1	1	-	-	-	4	1	9	1	-	-	n=17
	C	-	-	1	-	-	1	-	4	1	2	2	-	1	n=12
	Total	**-**	**-**	**7**	**1**	**1**	**1**	**-**	**10**	**2**	**19**	**3**	**-**	**1**	**N=45**
Q2	A	-	-	3	-	-	-	1	3	4	3	1	-	1	n=16
	B	-	-	1	-	-	2	2	2	4	3	3	-	-	n=17
	C	1	-	-	1	1	-	-	4	-	1	4	-	-	n=12
	Total	**1**	**-**	**4**	**1**	**1**	**2**	**3**	**9**	**8**	**7**	**8**	**-**	**1**	**N=45**
Q3	A	2	2	4	-	-	-	1	1	1	4	-	1	-	n=16
	B	2	-	1	-	-	-	1	4	1	6	-	1	1	n=17
	C	-	-	-	-	1	1	-	2	2	3	1	-	2	n=12
	Total	**4**	**2**	**5**	**-**	**1**	**1**	**2**	**7**	**4**	**13**	**1**	**2**	**3**	**N=45**
Q4	A	-	-	1	-	-	-	-	1	5	1	2	4	2	n=16
	B	-	-	-	1	2	1	-	1	6	2	1	-	3	n=17
	C	-	-	-	1	1	1	1	2	1	1	1	1	2	n=12
	Total	**-**	**-**	**1**	**2**	**3**	**2**	**1**	**4**	**12**	**4**	**4**	**5**	**7**	**N=45**

For Question 2, the melodic dictation, different conditions prevailed: taking all three groups together, 32 of the 45 subjects (i.e., 71%) were roughly equally divided between (i) the score and the self-rating measures remaining the same, (ii) the self-rating measure

remaining the same but the score difference being positive, (iii) the self-rating measure remaining the same but the score difference being negative, and (iv) the self-rating and score differences moving in opposite directions with the self-rating difference measure being higher than that for the score. In each of Groups A and B, a little over 50% fall into categories in which subjects do not fully recognise their improvement.

Taking all three groups together, the distribution for scale/mode recognition which was the skill tested in Question 3 is similar to that for rhythmic dictation in Question 1; however, it seems that students were in some degree more able to recognise and to admit their improvement in the less complex tasks required of them in this question. In Group A, 25% rated themselves the same at the end of the study, despite the measured improvement in their ability; and a further 25% whose scores indicated improvement *also* rated themselves better at the end of the study. Most prominently in Group B, 35% of subjects showed both a better self-rating and an improved score at the end of the study; the next most prominent feature was a further 23.5% whose self-rating and score differences moved in opposite directions and for whom the score difference measure is higher than for the self-rating.

The final question had to do with interval recognition, and this being the question for which a strong ceiling effect was observed, it is perhaps unsurprising that a large number (26.6%) of the total number of participants, (31.25% of Group A and 35.5% of Group B) retained the same score and rated themselves the same at the time of the post-test; a further 26.6% retained the same score, yet rated themselves differently – 15.5% rated themselves lower, and 11.1% higher. This suggested the strong possibility that students' self-perception and their actual performance may not agree.

5.7.2 Rhythm

For all three groups, as can be seen from Tables 5.39 – 5.41, if both the self-rating and the test scores increased, then the score always increased more then the self-rating. If the self-rating difference and the score difference moved in opposite directions, then the score was higher (i.e., the self-rating moved in a negative direction but the score moved in a positive direction). Only one subject (in Group C) maintained the same score for both pre-test and post-test but changed the self-rating; the self-rating in this instance moved in a negative direction. The clear overall trend was the one to be found in Groups A and B: to maintain the same self-rating even though the score difference was a positive amount.

Table 5.39

Group A: Rhythmic perception: self-rating and performance

Subject	Pre-test Self-rating	Q1 score[1]	Post-test Self-rating	Q1 score[1]	Self-rating difference	Q1 score difference
1	Good	12.50	Very Good	18.50	+1	+6.00
2	Good	14.50	Good	19.00	= 0	+4.50
5	Fair	15.50	Fair	19.00	= 0	+3.50
6	Fair	9.75	Fair	18.00	= 0	+8.25
7	Fair	11.00	Fair	14.50	= 0	+3.50
8	Fair	13.00	Fair	18.00	= 0	+5.00
9	Good	13.50	Good	18.50	= 0	+5.00
10	Fair	9.00	Poor	8.25	-1	-0.75
11	Good	16.00	Very Good	18.00	+1	+2.00
12	Good	12.00	Fair	17.50	-1	+5.50
13	Fair	12.50	Fair	18.50	= 0	+6.00
14	Fair	13.50	Good	19.50	+1	+6.00
16	Fair	16.00	Fair	18.00	= 0	+2.00
17	Fair	11.50	Poor	16.50	-1	+5.00
18	Poor	12.00	Fair	14.50	+1	+2.50
19	Fair	12.50	Good	19.00	+1	+6.50

[1]maximum = 20

In Group A, half the group used the same self-rating but their score increased; and about one-third of the group experienced upward movement both for the self-rating and for the score, with the score difference being greater then the self-rating difference.

For Group B (see Table 5.40), just over half the group used the same self-rating but their score increased, similar to Group A; but differently from Group A, just under one-quarter of the group had their self-rating and score differences move in opposite directions.

In Group C (see Table 5.41) there was no clear trend: one-third of the group had their self-rating and score differences move in opposite directions; one-third of the group maintained the same self-rating but the score difference changed – increasing and decreasing in equal portions.

Table 5.40

Group B: Rhythmic perception: self-rating and performance

Subject	Pre-test Self-rating	Q1 score[1]	Post-test Self-rating	Q1 score[1]	Self-rating difference	Q1 score difference
1	Good	12.0	Fair	15.0	-1	+3.0
2	Very Good	17.5	Good	19.5	-1	+2.0
3	Good	18.5	Good	19.5	= 0	+1.0
4	Very Good	19.5	Very Good	20.0	= 0	+0.5
5	Good	11.0	Fair	16.5	-1	+5.5
7	Very Good	17.0	Very Good	18.5	= 0	+1.5
8	Good	14.0	Good	18.5	= 0	+4.5
9	Good	19.0	Good	17.5	= 0	-1.5
10	Fair	16.5	Good	18.0	+1	+2.5
11	Very Good	18.5	Very Good	19.0	= 0	+0.5
12	Fair	11.0	Fair	15.0	= 0	+4.0
13	Very Good	17.5	Very Good	19.5	= 0	+2.0
14	Good	16.5	Good	17.0	= 0	+0.5
15	Good	16.0	Good	18.0	= 0	+2.0
16	Very Good	18.5	Very Good	18.9	= 0	=0.0
17	Very Good	16.0	Good	15.0	-1	-1.0
19	Very Good	15.5	Good	17.0	-1	+1.5

[1]maximum = 20

Table 5.41

Group C: Rhythmic perception: self-rating and performance

Subject	Pre-test Self-rating	Q1 score	Post-test Self-rating	Q1 score	Self-rating difference	Q1 score difference
1	Good	13.50	Good	13.50	= 0	=0.00
2	Good	11.50	Fair	9.00	-1	-2.50
3	Good	9.50	Good	11.50	= 0	+2.00
4	Fair	8.50	Fair	8.25	= 0	-0.25
5	Good	7.25	Poor	8.75	-2	+1.50
6	Good	16.50	Fair	18.00	-1	+1.50
7	Good	0.00	Poor	3.75	-2	+3.75
8	Good	11.00	Fair	11.00	-1	+0.00
9	Fair	6.25	Fair	7.00	= 0	+0.75
11	Good	11.00	Fair	14.50	-1	+3.50
13	Poor	4.25	Fair	6.25	+1	+2.00
14	Good	11.00	Good	10.50	= 0	-0.50

[1]maximum = 20

5.7.3 Melody

Although some subjects registered an upward movement in both the test score and in the self-rating for the melody question, no subject in any group registered a positive difference in the self-rating that was greater than the positive difference for the test score. Otherwise, there was no clear trend for melody work as there was for rhythm work.

For Group A (see Table 5.42), roughly equal numbers (just under one-quarter of the group in each case) had both differences move in a positive direction, the score difference being greater then the self-rating difference; or there was movement in opposite directions with the score moving positively and the self-rating moving negatively; or the same self-rating was used even though the score difference moved positively.

Group B (see Table 5.43) was similar in respect to the first two conditions just described for Group A; however, there were three for whom the self-rating retained the same but the score-difference was negative rather than positive.

Table 5.42

Group A: Melodic perception: self-rating and performance

Subject	Pre-test Self-rating	Q2 score[1]	Post-test Self-rating	Q2 score[1]	Self-rating difference	Q2 score difference
1	Fair	15.0	Good	16.5	+1	+ 1.5
2	Very Good	20.0	Very Good	20.0	= 0	= 0.0
5	Fair	19.0	Fair	19.0	= 0	= 0.0
6	Good	20.0	Good	20.0	= 0	= 0.0
7	Good	17.0	Fair	18.5	-1	+ 1.5
8	Good	20.0	Good	20.0	= 0	= 0.0
9	Poor	13.0	Very Poor	14.5	-1	+ 1.5
10	Good	14.0	Fair	16.0	-1	+ 2.0
11	Good	18.5	Very Good	20.0	+1	+ 1.5
12	Good	19.0	Good	20.0	= 0	+ 1.0
13	Fair	20.0	Fair	19.5	= 0	- 0.5
14	Fair	18.0	Good	20.0	+1	+ 2.0
16	Fair	17.5	Fair	18.0	= 0	+ 0.5
17	Fair	14.0	Poor	14.0	-1	= 0.0
18	Poor	16.5	Fair	15.0	+1	- 1.5
19	Fair	13.0	Fair	16.0	= 0	+ 3.0

[1]maximum = 20

Table 5.43

Group B: Melodic perception: self-rating and performance

Subject	Pre-test Self-rating	Q2 score	Post-test Self-rating	Q2 score	Self-rating difference	Q2 score difference
1	Fair	16.50	Fair	16.50	= 0	= 0.00
2	Fair	13.50	Fair	13.50	= 0	= 0.00
3	Poor	17.75	Fair	17.50	+1	- 0.25
4	Good	13.50	Good	15.50	= 0	+ 2.00
5	Fair	12.00	Poor	15.50	-1	+ 3.50
7	Good	14.00	Good	18.50	= 0	+ 4.50
8	Fair	15.50	Good	18.50	+1	+ 3.00
9	Good	20.00	Good	20.00	= 0	= 0.00
10	Good	20.00	Good	20.00	= 0	= 0.00
11	Fair	14.00	Very Poor	15.50	-2	+ 1.50
12	Fair	14.50	Poor	13.00	-1	- 1.50
13	Good	14.50	Good	17.50	= 0	+ 3.00
14	Good	20.00	Fair	17.00	-1	-3.00
15	Fair	18.00	Fair	16.50	= 0	- 1.50
16	Good	20.00	Very Good	19.00	+1	- 1.00
17	Fair	16.00	Fair	14.00	= 0	- 2.00
19	Good	19.00	Good	16.50	= 0	- 2.50

[1]maximum = 20

Table 5.44

Group C: Melodic perception: self-rating and performance

Subject	Pre-test Self-rating	Q2 score (possible = 20)	Post-test Self-rating	Q2 score (possible = 20)	Self-rating difference	Q1 score difference
1	Fair	16.0	Fair	14.5	= 0	- 1.5
2	Good	16.0	Fair	17.0	-1	+ 1.0
3	Good	9.0	Fair	10.0	-1	+ 1.0
4	Fair	7.5	Poor	6.5	-1	- 1.0
5	Good	8.0	Poor	7.0	-2	- 1.0
6	Fair	18.0	Fair	17.5	= 0	- 0.5
7	Good	6.5	Poor	7.0	-2	+ 0.5
8	Poor	10.5	Fair	11.5	+1	+ 1.0
9	Fair	10.0	Fair	13.0	= 0	+ 3.0
11	Good	18.5	Poor	19.5	-2	+ 1.0
13	Fair	12.0	Fair	11.5	= 0	- 0.5
14	Good	17.0	Good	13.5	= 0	- 2.5

[1]maximum = 20

For Group C (see Table 5.44) it can be seen that one-third of the subjects had movement in opposite directions, the score difference being positive and the self-rating

moving in a negative direction; another one-third kept the same self-rating but the score difference was negative; the other one-third was scattered evenly among other conditions.

5.7.4 Scale/Mode Recognition

As indicated in Table 5.45, one-half (i.e., n=8) of the subjects in Group A gave themselves a higher self-rating at the time of the post-test as well as their test score showing improvement; of these, half had a score difference which was greater than the self-rating difference, quarter had a self-rating difference which was greater, and quarter had both differences increase by the same amount. One-quarter (i.e., n=4) of the subjects maintained the same self-rating but their test score increased; the other one-quarter were scattered singly across other conditions.

Table 5.45

Group A: Scale/mode recognition: self-rating and performance

Subject (n=16)	Pre-test self-rating	Q3 score	Post-test self-rating	Q3 score	Self-rating difference	Q3 score difference
1	Fair	9	Good	11	+1	+ 2
2	Good	11	Very Good	12	+1	+ 1
5	Fair	9	Good	12	+1	+ 3
6	Good	11	Good	12	= 0	+ 1
7	Fair	8	Good	12	+1	+ 4
8	Good	11	Good	12	= 0	+ 1
9	Fair	9	Very Good	10	+2	+ 1
10	Good	5	Fair	8	-1	+ 3
11	Fair	11	Very Good	12	+2	+ 1
12	Good	9	Good	12	= 0	+ 3
13	Poor	10	Good	12	+2	+ 2
14	Good	12	Very Good	12	+1	= 0
16	Good	11	Good	11	= 0	= 0
17	Good	11	Good	12	= 0	+ 1
18	Fair	4	Good	12	+1	+ 8
19	Fair	11	Very Good	10	+2	- 1

[1]maximum = 12

Table 5.46 shows that just over one-third (n=6) of Group B kept the same self-rating but experienced a positive score difference; just under one-quarter (n=4) experienced movement in opposite directions in which the score difference moved positively but the self-rating difference moved in a negative direction; two subjects showed a positive movement of the

same amount for both differences; and the remaining five subjects were scattered singly across other conditions.

Table 5.46

Group B: Scale/mode recognition: self-rating and performance

Subject	Pre-test Self-rating	Q3 score[1]	Post-test Self-rating	Q3 score[1]	Self-rating difference	Q3 score difference
1	Good	9	Good	12	= 0	+ 3
2	Fair	8	Fair	12	= 0	+ 4
3	Fair	11	Good	12	+1	+ 1
4	Good	6	Poor	11	-2	+ 5
5	Good	10	Fair	11	-1	+ 1
7	Fair	11	Good	10	+1	- 1
8	Good	11	Good	11	= 0	= 0
9	Good	7	Good	11	= 0	+ 4
10	Fair	12	Very Good	12	+2	= 0
11	Fair	9	Very Poor	9	-2	= 0
12	Fair	2	Poor	11	-1	+ 9
13	Good	10	Very Good	11	+1	+ 1
14	Fair	8	Fair	12	= 0	+ 4
15	Good	9	Good	12	= 0	+ 3
16	Good	9	Very Good	12	+1	+ 3
17	Fair	5	Fair	7	= 0	+ 2
19	Good	7	Fair	12	-1	+ 5

[1]maximum = 12

Table 5.47

Group C: Scale/mode recognition: self-rating and performance

Subject	Pre-test Self-rating	Q3 score[1]	Post-test Self-rating	Q3 score[1]	Self-rating difference	Q3 score difference
1	Good	9	Fair	10	-1	+ 1
2	Fair	6	Fair	9	= 0	+ 3
3	Good	7	Fair	7	-1	= 0
4	Fair	7	Poor	2	-1	- 5
5	Good	7	Poor	6	-2	- 1
6	Poor	7	Poor	10	= 0	+ 3
7	Poor	5	Poor	5	= 0	= 0
8	Very Poor	7	Very Poor	7	= 0	= 0
9	Fair	6	Fair	7	= 0	+ 1
11	Good	10	Fair	10	-1	= 0
13	Fair	7	Fair	5	= 0	- 2
14	Good	3	Fair	8	-2	+ 5

[1]maximum = 12

One-quarter of Group C (n=3) recorded the same self-rating both times but their score difference increased; one-sixth (n=2) maintained the same score and self-rating throughout; another one-sixth kept the same score but rated themselves lower; and another one-sixth rated themselves lower but their score actually increased; the other one-quarter (n=3) are scattered singly across other conditions (see Table 5.47).

5.7.5 Interval recognition

Five students, representing just under one-third of Group A (see Table 5.48), kept the same score and did not change their self-rating; four students maintained the same score but raised their self-rating. A small portion (one-eighth [n=2]) also maintained the same score but lowered their self-rating; another one-eighth remained consistent in their self-rating but suffered a decline in their score; the other three students were scattered individually across other conditions.

Table 5.48

Group A: Interval recognition: self-rating and performance

Subject	Pre-test Self-rating	Q4 score[1]	Post-test Self-rating	Q4 score[1]	Self-rating difference	Q4 score difference
1	Good	5.5	Very Good	8.0	+1	+ 3.0
2	Very Good	8.0	Very Good	8.0	= 0	= 0.0
5	Good	8.0	Fair	8.0	-1	= 0.0
6	Good	8.0	Good	8.0	= 0	= 0.0
7	Very Good	8.0	Good	8.0	-1	= 0.0
8	Good	8.0	Good	8.0	= 0	= 0.0
9	Fair	8.0	Very Good	8.0	+2	= 0.0
10	Good	7.5	Good	6.0	= 0	- 1.5
11	Good	8.0	Very Good	8.0	+1	= 0.0
12	Good	8.0	Good	8.0	= 0	= 0.0
13	Fair	8.0	Good	8.0	+1	= 0.0
14	Good	8.0	Good	8.0	= 0	= 0.0
16	Good	8.0	Very Good	8.0	+1	= 0.0
17	Fair	7.0	Poor	7.5	-1	+ 0.5
18	Fair	6.5	Fair	5.0	= 0	- 1.5
19	Fair	6.0	Fair	6.5	= 0	+ 0.5

[1]maximum = 8

Table 5.49

Group B: Interval recognition: self-rating and performance

Subject	Pre-test Self-rating	Q4 score[1]	Post-test Self-rating	Q4 score[1]	Self-rating difference	Q4 score difference
1	Fair	5.5	Poor	7.5	-1	+ 2.0
2	Very Good	8.0	Good	6.5	-1	- 1.5
3	Fair	8.0	Fair	7.5	= 0	- 0.5
4	Fair	7.5	Poor	7.5	-1	= 0.0
5	Good	7.0	Fair	6.5	-1	- 0.5
7	Good	7.5	Fair	7.5	-1	= 0.0
8	Good	7.0	Fair	6.0	-1	- 1.0
9	Very Good	8.0	Very Good	8.0	= 0	= 0.0
10	Very Good	8.0	Very Good	8.0	= 0	= 0.0
11	Fair	7.0	Very Poor	6.5	-2	- 0.5
12	Fair	7.0	Fair	7.0	= 0	= 0.0
13	Good	7.0	Good	7.0	= 0	= 0.0
14	Fair	8.0	Fair	8.0	= 0	= 0.0
15	Very Good	8.0	Good	8.0	-1	= 0.0
16	Very Good	8.0	Very Good	8.0	= 0	= 0.0
17	Good	6.0	Good	6.5	= 0	+ 0.5
19	Fair	6.5	Fair	7.0	= 0	+ 0.5

[1]maximum = 8

Table 5.50

Group C: Interval recognition: self-rating and performance

Subject	Pre-test Self-rating	Q4 score[1]	Post-test Self-rating	Q4 score[1]	Self-rating difference	Q4 score difference
1	Fair	8.0	Good	8.0	+1	= 0.0
2	Good	8.0	Good	7.0	= 0	- 1.0
3	Good	2.0	Fair	0.0	-1	- 2.0
4	Fair	2.0	Poor	3.0	-1	+ 1.0
5	Good	3.0	Poor	1.5	-2	- 1.5
6	Poor	6.5	Poor	6.5	= 0	= 0.0
7	Very Poor	2.0	Poor	0.5	+1	- 1.5
8	Poor	4.5	Very Poor	3.5	-1	- 1.0
9	Fair	3.0	Poor	3.0	-1	= 0.0
11	Very Good	7.0	Good	7.0	-1	= 0.0
13	Fair	3.0	Fair	5.0	= 0	+ 2.0
14	Good	0.0	Fair	5.5	-1	+ 5.5

[1]maximum = 8

Reference to Table 5.49 shows that Group B had one-third (n=6) of the cohort who gave themselves the same self-rating as well as maintaining the same test score – a consequence of the ceiling effect observed for this question of the test. A further three maintained the same score but rated themselves lower at the post-test; the remaining eight students are scattered across other conditions.

Group C had only three subjects who gave themselves a higher self-rating (see Table 5.50). No subject in this group experienced an increased test score as well as giving a higher self-rating; the other nine subjects were scattered across all the remaining conditions.

5.8 Summary

All three groups improved their performance across the test as a whole, although the positive difference for Group C is not as great as the positive differences achieved by Groups A and B. Group A commenced at a lower level and finished at a higher level than Group B. The level of achievement for Group C falls well below the levels of achievement for Groups A and B.

Question 1 results showed all three groups registering an improved performance in rhythmic dictation from pre-test to post-test, with Group A showing the most positive improvement; Group B measured some improvement, but Group C achieved only a very small improvement.

Groups A and B recorded some improvement for melodic perception in Question 2, whereas Group C almost maintained the *status quo*. As with Question 1, the greatest improvement was shown by Group A; Group B registered only a small improvement, and Group C registered a slight decrease in performance. This represents some differences from Question 1 in which all groups made some improvement, and in which the improvement was greater than for Question 2.

Question 3 results revealed that Groups A and B made readily discernible progress in recognition of scales and modes, whereas Group C made very little progress. The mean scores for Question 3(b) are lower in every instance than the corresponding means in Question 3(a), indicating a greater challenge to match mode pairs rather than scale pairs. In both the pre-test and post-test the range of scores for both scales and modes remained similar, although Groups A and B revealed a strong ceiling effect.

In Question 4, none of the groups registered any significant change in interval recognition. Group A maintained a similar score from pre-test to post-test, while Group B

showed a small decline in performance and Group C a small improvement in performance. Despite this increase shown for Group C, the results were generally lower than those recorded by Groups A and B. A ceiling effect is observed again, but weaker than in Question 3.

The findings of the study are discussed in chapter 6 in relation to the research questions outlined in chapter 1.

Chapter 6
Discussion

6.1 Addressing the Primary Research Questions

The first part of this chapter is devoted to answering each of the research questions in turn, offering relevant discussion which has not been addressed in chapter 5 when the results of the study were given. Following this is a presentation of any other discussion which arises. Limitations of the study then will be described, followed by recommendations arising from the study and concluding comments.

6.1.1 Do internally enrolled and externally enrolled Music Craft students show a similar rate of overall development in aural work?

It was reported in chapter 5 (see section 5.3) that all three groups improved their performance across the test as a whole: in a score out of 60, Group A, the external students, registered a positive mean difference of 7.09, whilst Group B, the internal students, measured a positive mean difference of 4.46 – a difference in means of 2.63 between the two groups.

Whilst it can be said that both groups showed development, the significantly greater improvement in Group A's results indicates that the internally enrolled and externally enrolled students did *not* show a *similar* rate of overall development in aural work; rather, the externally enrolled students showed a better overall rate of development in aural work.

6.1.2 Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in rhythmic work?

The scores for rhythm (a) exhibited a strong ceiling effect in both the pre-test and post-test results (see Table 5.9); those for rhythm (b) (see Table 5.10) showed a less marked ceiling effect, although the means were still quite high (6.50 to 6.81 for Group A and 7.38 to 7.79 for Group B – positive differences of 0.31 and 0.41 respectively). The scores for rhythm (c) (see Table 5.11) showed a wider range of scores and the greatest improvement: for Group A the mean scores were 2.34 and 5.90 (a difference of +3.56), and for Group B, 4.82 and 5.96 (a difference of +1.1).

Similarly to the previous research question, the results indicate that whilst both groups of students showed development, the significantly greater improvement in Group A's results indicates that the internally enrolled and externally enrolled students did *not* show a *similar*

rate of overall development in rhythmic work; rather, the externally enrolled students showed a better rate of development in rhythmic work.

Hofstetter's study (1981) on computer-based recognition of perceptual patterns and learning styles in rhythmic dictation exercises identified several confusions amongst the participants with respect to dotted, duplet and triplet notes, and also reported that the dotted crotchet frequently was not correctly identified. Rhythm (c) in the research test (see Figure 4.3) provided an opportunity to investigate whether the same phenomenon applied to the subjects in this study. The rhythm contains two triplet quaver figures (bars 1 and 3), a semiquaver/dotted-quaver figure (bar 4), and two dotted-quaver/semiquaver figures (one in bar 2, and one in bar 4 with the semiquaver tied to the following beat).

Examination of the completed tests supported Hofstetter's finding except in relation to duplet notes and the dotted crotchet, there being none included in the test rhythms. The confusions revealed in the subjects' responses in this project fell into two categories: (i) dotted or triplet rhythms which were represented incorrectly; and (ii) rhythms which were incorrectly represented as either dotted or triplet rhythms. By and large the confusions were much more numerous in the pre-test than in the post-test, so that even though the misperceptions were not totally eradicated by the aural training, they were certainly diminished.

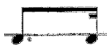
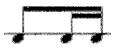
In the first category, triplet or dotted rhythmic figures were most commonly confused as follows:

-  became
  -  (seven instances in Group A and two in Group B)
  -  (also reasonably common, one in Group A and four in Group B)
  -  (two instances, one each in Groups A and B);

-  became
  -  (nine instances in Group A and five in Group B, i.e., the subjects were not aware of the small note value falling just prior to the following beat);
-  became
  -  (six instances in Group A and 10 in Group B; having only two rather than three sounds, it appears that when there is no new sound *on* the beat, the listener's ability to perceive the number of sounds is impaired)
  -  (three times in Group B only; this follows some musical logic);
-  becomes most commonly, from a large variety of confusions,
  -  (four in Group A and two in Group B)
  -  (six in Group B only)
  -  (one instance in Group B only, i.e., an augmented version of the correct rhythm).

In the second category, the following rhythmic figures were incorrectly represented by dotted or triplet rhythms, also in descending order of frequency:

-  became
  -  (eight times in Group A and three times in Group B)
  -  (once in Group A and once in Group B)
  -  (once only, in Group A);

-  became
  -  (once in Group A and twice in Group B)
  -  (twice in Group B)
  -  (once, also in Group B);
-  became
  -  (twice in Group A and once in Group B)
  -  (once, in Group A)
  -  (once, in Group B);
-  became
  -  (once, in Group A)
  -  (once, in Group B).

6.1.3 Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in melodic work?

Reference to Figure 5.21 shows that once more, whilst both Groups A and B showed development in melodic work, the amount of development exhibited by Group A is clearly greater than that of Group B. The positive mean differences for the three melodies are 0.03, 0.34 and 0.41 for Group A, and 0.05, 0.08 and 0.18 for Group B; thus, although Group A shows greater development, it is not significantly greater than for Group B.

This research question can therefore be answered in the affirmative: that is, internally enrolled and externally enrolled Music Craft students show a similar rate of development in melodic work, despite the insignificant decline in performance for Group B.

Reference to Tables 5.18 and 5.19 shows that some subjects did not achieve as well for melodic dictation in the post-test as in the pre-test. Although Simmonds (1978) reported that pitch perception could be affected by the state of the listener, it is unlikely to be a coincidental phenomenon that so many more subjects in Group B than in Group A suffered a decline in performance.

Once again, demographic considerations do not appear to come into play. Of the subjects identified at the beginning of the previous paragraph, three were males and six were females; a range of instruments was represented (three pianists, two sopranos, and one each of viola, flute, saxophone and trumpet); four had nominated a secondary instrument whereas five had not; one had identified Licentiate of Music as the highest instrumental qualification gained, four at Grade 8, one at Grade 7, one at Grade 6, one at Grade 5, and one had not completed any formal performance qualification; the two subjects from Group A whose performance in melodic work declined from pre-test to post-test were aged 57 and 41, while those from Group B were aged 17 (four), 18 (two) or 19 (one). The fact that there were so many more in Group B points to age difference as a possible factor: without intending to be dismissive, it may be that the generally younger age of the Group B subjects gave rise to a certain carelessness because they already "knew" the test to be easy; however, since the phenomenon is unexplained, further research to investigate it is recommended.

Melody (b) in the test (see Figure 4.5) bears a similarity to several folk or nursery tunes. The relevant characteristics are the repeated notes and the ascending 5^{th} in bar 1, the sixth and fifth degrees of the scale on beats 1 and 3 respectively of bar 2, and the stepwise descending "skeleton" (4-3-2-1) on the main beats of bars 3 and 4. The "chunking" habit might account for students who associated this melody with the nursery tune *Baa baa black sheep* or a host of other nursery tunes with a similar construction. One example is B5, who for bar 2 of this melody notated the pitch as 6-7-1^1-7-6 rather than 6-1^1-7-6-5; while this is not an accurate notation of the nursery tune, it does use the contour of the nursery tune rather than the contour of the test melody at that point. Another example is to be found in bar 3, in which B16 wrote the pitches 4-4-3-3 as in the nursery tune rather than 4-5-3-4 as in the test melody. Nursery rhyme tunes that are imbedded in long term memory may have altered the students'

perception of a very similar, but novel, tune. Instead of perceiving the correct melody, B16 may have matched the new stimulus to something in his/her long-term memory.

It is important to consider and to give training in a variety of contextual settings because it is acknowledged that perception can vary according to context. It has been reported, for example, that both performance and perception of melodies were less accurate for ascending patterns than for descending patterns (Killian, 1991). Several examples were found amongst the completed tests which supported Killian's findings; there were, however, some responses which appeared to contradict Killian because they were inaccurate perceptions of *descending* rather than ascending intervals or patterns. The most common of these were

- to write bar 1 of melody (a) as 5-3-1 rather than 5-4-3;
- to miscalculate in melody (c) the interval from bar 1 to bar 2 (e.g., bar 2 became 4-5-3 rather than 3-4-2); an interesting error which occurred in the responses of two subjects was for bar 1 to be written as 5-3-1-6 rather than 3-2-1-5.

Dowling wrote in Aiello (1994) that memory for contour can be affected by tonal context. There were some occasions in this study when subjects favoured an ascending pattern even though the contour was descending, and the opposite misperception was also represented. It is uncertain whether tonal context was the cause for failure accurately to perceive the melodic contour, but this was not an uncommon occurrence in certain places. Since some of these were V-shaped patterns which were inverted by the subject, it may also be possible that a smaller-scale version of the finding reported by Long (1977) that V-shaped melodies were not as easily remembered as M-shaped melodies was in operation.

6.1.4 Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in scale/mode recognition?

Figure 5.36 shows an improvement in scale/mode recognition for both Groups A and B. The pre-test naming of modes was less successful than for the scales. The post-test shows a considerable improvement for Groups A and B in identifying modes accurately, which tends to indicate that the programme of work was helpful in both external and internal mode for this aural acuity. The positive mean differences for Group A are 0.76 for scales and 1.12 for modes; those for Group B are 1.12 and 1.42 respectively. For Question 3 overall, then, the positive mean differences are 0.94 for Group A and 1.27 for Group B, a difference of 0.33 in

favour of Group B. Being of no statistical significance, it can be reported in response to this research question, therefore, that internally enrolled and externally enrolled Music Craft students show a similar rate of development in scale/mode recognition.

The improvement shown by Groups A and B would likely be due to the instruction received, but it could also be that the pitch patterns of the scales and (particularly) the modes were not all known to the subjects when completing the pre-test, and that the improved result is due to increased content knowledge as well as to an improvement in processing that knowledge. It might also be that, without realising it, listeners were already familiar with modal patterns (especially the dorian and mixolydian modes) from exposure to popular music, and that the familiarisation helped them to identify modes once they had become aware of the correct labels.

A further problem identified from the results was that in Group B responses, the modes were more frequently incorrectly named than in Group A. Table 6.1 shows the error rate; blank responses or responses using the name of a scale rather than of a mode have not been included in the tally.

Table 6.1

Question 3(b): Incorrect mode identification

Mode	Correct answer	Incorrect responses	Group A		Group B	
			Pre-test	Post-test	Pre-test	Post-test
(i)	Dorian	Aeolian	-	1	2	-
		Mixolydian	-	-	1	1
(ii)	Phrygian	Lydian	-	1	1	-
		Mixolydian	-	-	1	-
(iii)	Lydian	Aeolian	-	-	1	1
		Dorian	-	-	1	-
		Ionian	2	-	-	-
		Mixolydian	3	-	2	5
		Phrygian	-	-	1	-
Total incorrect responses			**5**	**2**	**10**	**7**

6.1.5 Do internally enrolled and externally enrolled Music Craft students show a similar rate of development in interval recognition?

In chapter 5 it was reported that none of the groups registered any significant change in interval recognition, Group A maintaining the *status quo* and Group B showing a minor decline from pre-test to post-test. Group A showed positive mean differences of 0.30 and 0.03 for the two parts of Question 4, whereas Group B registered negative mean differences of 0.08 and 0.26 respectively. The finding of this project, therefore, is that internally enrolled and externally enrolled Music Craft students show a similar rate of development in interval recognition. Nevertheless, Group A recorded a positive difference (0.165) and Group B a negative difference (0.17).

Radocy (1978a) found that nonmusicians tend to hear intervals as wider than musicians hear them. In the present study, Groups A and B would be considered as the musicians, and Group C (albeit that they have some declared background) as the non-musicians. Table 6.2 shows that for Group A, intervals which were identified incorrectly in both the pre-test and post-test were most usually heard as too narrow, with only two in total heard as too wide; in Group B, the same phenomenon applied, although the number of intervals identified as too wide was greater than for Group A; in Group C, incorrect identification was again more often narrow than wide, although the number of intervals heard as wider was greater than for either Group A or Group B.

Radocy's findings are supported by the higher incidence of too widely identified intervals in Group C; however, such support is weakened somewhat by the number of widely identified intervals in Group B compared with Group A. A possible explanation for the difference between Group A and Group B responses could be that Group A subjects were, in general, mature-age students who had had experience in instrumental studio teaching, during which they would likely have prepared students for practical examinations which include a small aural component which, in the earlier grades, includes interval work; thus, Group A subjects are more likely to have worked with interval identification regularly (if not frequently) and could be expected to perform better at interval identification than Group B subjects.

Table 6.2 also indicates the frequency with which the intervals were incorrectly identified; certain of the incorrect responses were common. The major 3rd was identified wrongly most frequently as a minor 3rd (eight times) or a perfect 4th (six times). The former of these, being only a semitone too narrow, is perhaps understandable; but it is less easy to

understand the false recognition as a perfect 4th, the musical character and intent of which is vastly different from the target interval. The major 6th incorrectly recognised most commonly as a perfect 5th (11 times), and, although not so frequently, as a perfect octave (twice). As before, the musical character and intent of these intervals and the target interval are so different, it is difficult to understand the confusion. The major 2nd was identified six times as a *minor* 2nd and twice as a minor 3rd. The minor 2nd, being a semitone, is quite distinctive, and although near in size to the target interval, it is once again difficult to comprehend the confusion. The major 7th was incorrectly identified as a *minor* 7th 18 times. As with its inversion, the minor 2nd, the major 7th is a very distinctive interval with a quite specific musical character and intent, so that, although once again near in size to the target interval, the confusion is hard to comprehend. The incorrect identification of the major 7th as an augmented 4th (three times) is perhaps easier to understand, the commonality being that both intervals are a semitone short of another interval which features very early in the harmonic series.

Table 6.2

Question 4(b): Errors in interval recognition

	Interval	Group A		Group B		Group C		Total (all groups)	
		Wide	**Narrow**	**Wide**	**Narrow**	**Wide**	**Narrow**	**Wide**	**Narrow**
Pre-test	(i) Major 3rd	1	3	2	2	1	-	4	5
	(ii) Major 6th	-	1	2	3	-	2	2	6
	(iii) Major 2nd	-	2	1	-	-	-	1	2
	(iv) Perfect 8va	-	-	-	-	-	-	-	-
	(v) Major 7th	-	4	-	5	-	2	-	11
	Total	**1**	**10**	**5**	**10**	**1**	**4**	**7**	**24**
Post-test	(i) Major 3rd	-	3	3	-	2	1	5	4
	(ii) Major 6th	1	1	2	2	1	2	4	4
	(iii) Major 2nd	-	-	-	4	1	-	1	4
	(iv) Perfect 8va	-	-	-	-	-	-	-	-
	(v) Major 7th	-	4	-	6	-	2	-	12
	Total	**1**	**8**	**5**	**12**	**4**	**5**	**10**	**24**

Shatzkin (1981), in a study of interval and pitch recognition in and out of immediate context, observes that the higher the pitch, the more easily it was recognised. Given that all the test intervals started from middle C, it is the widest intervals in which the highest pitches are to be heard, that is, the perfect octave, the major 7th and the major 6th. Except for responses which were blank, the perfect octave was always accurately recognised by the participants in the current study; however, the major 7th was the interval which elicited the largest number of incorrect responses, identified in Table 6.2 and in the list just given. The major 6th fared better, but still occasioned a considerable number of incorrect answers, so it would seem that Shatzkin's finding with respect to tessitura cannot be supported in the present study. It would be fair, however, to consider whether comparison with Shatzkin's results is appropriate: his work dealt with intervals that were both in and out of context, whereas in this study none is contextual; Shatzkin specifically excluded the octave interval, the interval in the present study which was recognised with the greatest accuracy; in Shatzkin's study the intervals were heard four times each as against twice only; however, both studies used only ascending intervals and worked within a restricted tessitura.

Another concern revealed in Table 6.2 is that the pre-test and post-test responses for interval recognition contained approximately the same number of incorrectly identified intervals: 31 in the pre-test (seven wide and 24 narrow), and 34 in the post-test (10 wide and 24 narrow). It will be observed that the major 3rd and the major 6th register the same total number of incorrect responses for both tests, but that the distribution of wide and narrow identification is different; the major 2nd is identified wrongly twice more in the post-test, both times as too narrow, and the major 7th is identified wrongly once more in the post-test, also as too narrow. Even though a strong ceiling effect applied to the interval identification question, this would indicate that the training did not have a positive effect on students' performance for this skill. Perhaps because upward movement is more difficult to discriminate (Bentley, 1973) and descending intervals tend to be heard as larger (Radocy, 1978a), it can be implied that ascending intervals are heard as smaller, in which case the results here may not be considered atypical. This could be the subject of further research, but also identifies the need for alternative teaching strategies to be investigated and applied in the programme, particularly in the internal mode.

6.2 Addressing the Secondary Research Questions

Each of the three questions is addressed in turn.

6.2.1 Is there any correlation between actual achievement and students' self-rating of each aural skill measured?

One of the research questions sought to determine what correlation, if any, existed between subjects' self-rating and actual performance in the areas of rhythm dictation, melodic dictation, scale and mode recognition, and interval recognition, both within the pre-test and post-test individually and between the pre-test and post-test collectively.

With respect to rhythmic perception, the clear trend in Groups A and B was to maintain the same self-rating even though there was a positive score difference from pre-test to post-test. There was no clear trend for melodic perception as there was for rhythmic perception, but it is possible to identify a tendency: Group A consisted mostly of increased scores with either the same or a higher self-rating, and in Group B a little less than one quarter of the students achieved a higher score and identified a higher self-rating.

Across all three groups, the most striking condition for scale/mode recognition is for the self-rating to be maintained whereas the score difference is positive – the experience of almost one-third (n=13) of the subjects; the next most common condition, experienced by about one-sixth of the students (n=7), was for the score difference to increase but even though the students assigned themselves a lower self-rating.

Taking all groups together, the most common single condition for interval recognition, shared by just over one-quarter (n=12) of the cohort, is for the self-rating and the test score to remain unchanged; however, the most remarkable finding is that almost one-half (n=22), albeit scattered across a range of different conditions, assigned themselves a lower self-rating for this acuity.

6.2.2 Is there any correlation between actual achievement and students' self-rating for singing in tune and for holding a vocal part?

The singing of canons, that is, singing in a polyphonic context, is considered an important part of the Music Craft courses. Small (1982) reported in the findings of a study on the effect of a simultaneous melodic stimulus on harmony intonation of college singers, that singers performed slightly, though significantly, more in tune when singing with the in-tune melody stimulus. In the external mode, the CD-ROM provides students with a computer-

generated performance of the canon melody against which (or with which, depending on the way in which the student chooses to use the CD-ROM) the student sings.

For Groups A and B considered as a whole (see Table 6.3), the most common self-rating condition was to remain the same both for singing in tune and for holding a vocal part (13 subjects or 39.4%). Eight of these were from Group A (i.e., 50% of the group), and a further four (25% of the group) raised both self-ratings. In Group B, five (29.4%) indicated the same self-rating at both pre-test and post-test, with another five lowering both self-ratings at the post-test.

In seeking to compare the self-ratings for singing in tune and for holding a vocal part with actual combined achievement in rhythm perception, melody perception, scale/mode recognition, and interval recognition, it is noted that the largest grouping (seven students, or 21.2% of Groups A and B combined) comprises those whose achievements in three acuities improved while maintaining the same score for the other skill area; of these, four students (i.e., 12.1%) indicated the same self-rating for both singing in tune and for holding a vocal part at both the pre-test and the post-test. The next largest grouping is six students (18.9%) for whom results for two skill areas improved and results for the other two skill areas remained the same; of these, it transpired that again four subjects (12.1%) indicated the same self-rating for each skill both times. Also, five students can be identified who raised their self-ratings for both singing in tune and holding a vocal part after training; amongst these, several instances can be found of scores in two or more areas either remaining the same or decreasing. The implied trend is that students who demonstrate improvement tend to be shy of their achievements, whereas those who show little or no improvement identify abilities which cannot be justified; this suggests that any correlation between actual achievement and students' self-rating for singing in tune and for holding a vocal part may be more a function of personality traits than of musical accomplishment.

Table 6.3

Self-rating of singing in tune and holding a vocal part in relation to achievement in tested aural acuities.

Subject	Rhythm		Melody		Scales/modes		Intervals		Singing in tune	Holding a vocal part
	Self-rating difference	Score difference	Self-rating difference	Score difference	Self-rating difference	Score difference	Self-rating difference	Score difference	Self-rating difference	Self-rating difference
A1	+1.0	+6.0	+1.0	+ 1.5	+1.0	+ 2.0	+1.0	+ 3.0	= 0.0	= 0.0
A2	= 0.0	+4.5	= 0.0	= 0.0	+1.0	+ 1.0	= 0.0	= 0.0	= 0.0	= 0.0
A5	= 0.0	+3.5	= 0.0	= 0.0	+1.0	+ 3.0	-1.0	= 0.0	= 0.0	= 0.0
A6	= 0.0	+8.25	= 0.0	= 0.0	= 0.0	+ 1.0	= 0.0	= 0.0	= 0.0	= 0.0
A7	= 0.0	+3.5	-1.0	+ 1.5	+1.0	+ 4.0	-1.0	= 0.0	= 0.0	-1.0
A8	= 0.0	+5.0	= 0.0	= 0.0	= 0.0	+ 1.0	= 0.0	= 0.0	-1.0	-1.0
A9	= 0.0	+5.0	-1.0	+ 1.5	+2.0	+ 1.0	+2.0	= 0.0	+1.0	+1.0
A10	-1.0	-0.75	-1.0	+ 2.0	-1.0	+ 3.0	= 0.0	- 1.5	= 0.0	= 0.0
A11	+1.0	+2.0	+1.0	+ 1.5	+2.0	+ 1.0	+1.0	= 0.0	+1.0	+1.0
A12	-1.0	+5.5	= 0.0	+ 1.0	= 0.0	+ 3.0	= 0.0	= 0.0	= 0.0	= 0.0
A13	= 0.0	+6.0	= 0.0	- 0.5	+2.0	+ 2.0	+1.0	= 0.0	+1.0	+1.0
A14	+1.0	+6.0	+1.0	+ 2.0	+1.0	= 0.0	= 0.0	= 0.0	= 0.0	+1.0
A16	= 0.0	+2.0	= 0.0	+ 0.5	= 0.0	= 0.0	+1.0	= 0.0	= 0.0	= 0.0
A17	-1.0	+5.0	-1.0	= 0.0	= 0.0	+ 1.0	-1.0	+ 0.5	= 0.0	= 0.0
A18	+1.0	+2.5	+1.0	- 1.5	+1.0	+ 8.0	= 0.0	- 1.5	+1.0	+1.0
A19	+1.0	+6.5	= 0.0	+ 3.0	+2.0	- 1.0	= 0.0	+ 0.5	+1.0	= 0.0
B1	-1.0	+3.0	= 0.0	= 0.0	= 0.0	+ 3.0	-1.0	+ 2.0	= 0.0	= 0.0
B2	-1.0	+2.0	= 0.0	= 0.0	= 0.0	+ 4.0	-1.0	- 1.5	= 0.0	-1.0
B3	= 0.0	+1.0	+1.0	- 0.25	+1.0	+ 1.0	= 0.0	- 0.5	= 0.0	= 0.0
B4	= 0.0	+0.5	= 0.0	+ 2.0	-2.0	+ 5.0	-1.0	= 0.0	-1.0	-1.0
B5	-1.0	+5.5	-1.0	+ 3.5	-1.0	+ 1.0	-1.0	- 0.5	-1.0	-1.0
B7	= 0.0	+1.5	= 0.0	+ 4.5	+1.0	- 1.0	-1.0	= 0.0	-1.0	+1.0
B8	= 0.0	+4.5	+1.0	+ 3.0	= 0.0	= 0.0	-1.0	- 1.0	= 0.0	+1.0
B9	= 0.0	-1.5	= 0.0	= 0.0	= 0.0	+ 4.0	= 0.0	= 0.0	= 0.0	+1.0
B10	+1.0	+2.5	= 0.0	= 0.0	+2.0	= 0.0	= 0.0	= 0.0	+1.0	+1.0
B11	= 0.0	+0.5	-2.0	+ 1.5	-2.0	= 0.0	-2.0	- 0.5	-2.0	-1.0
B12	= 0.0	+4.0	-1.0	- 1.5	-1.0	+ 9.0	= 0.0	= 0.0	= 0.0	-1.0
B13	= 0.0	+2.0	= 0.0	+ 3.0	+1.0	+ 1.0	= 0.0	= 0.0	= 0.0	= 0.0
B14	= 0.0	+0.5	-1.0	-3.0	= 0.0	+ 4.0	= 0.0	= 0.0	= 0.0	= 0.0
B15	= 0.0	+2.0	= 0.0	- 1.5	= 0.0	+ 3.0	-1.0	= 0.0	+1.0	= 0.0
B16	= 0.0	=0.0	+1.0	- 1.0	+1.0	+ 3.0	= 0.0	= 0.0	= 0.0	= 0.0
B17	-1.0	-1.0	= 0.0	- 2.0	= 0.0	+ 2.0	= 0.0	+ 0.5	-1.0	-1.0
B19	-1.0	+1.5	= 0.0	- 2.5	-1.0	+ 5.0	= 0.0	+ 0.5	-1.0	-1.0

6.2.3 Is there any correlation between subjects' measured achievement and demographic considerations?

This question was addressed in some detail in chapter 5 (see section 5.1). The correlations which were detected are only briefly summarised here:

- for Group A, there was a negative association between age and improvement in melodic dictation;
- the pre-test melodic dictation score is significantly higher on average for pianists than for non-pianists;
- the pre-test total scores (i.e., the sum of the separate scores for Questions 1-4) is significantly higher on average for pianists than non-pianists;
- improvement in the self-rating score is significantly higher on average for pianists than for non-pianists;
- positive correlations were found between the standard achieved on the principal instrument and pre-test scores, although none was statistically significant.

Additionally, although not specifically sought through the survey, associations were found with the *number* of instruments played. One of these is applicable to Group A, and the remainder applicable to Group C; no significant effects were detected in Group B.

- in Group A, those playing two or more instruments experienced on average a significant improvement in scale/mode recognition;
- in Group C there is a highly significant positive association between the number of instruments played and the pre-test self-rating score;
- in Group C there is a significant positive association between the number of instruments played and the pre-test score for Question 3(a);
- in Group C there is a significant positive association between the number of instruments played and on the total score of Questions 1-4.

6.3 Limitations of the Study

Some limitations can be identified in relation to the test design, the research design, and the survey.

Only a small number of subjects participated in the study. The maximum number possible in Groups A and B was entirely dependent on the enrolments in the course *Music Craft 1* at the time the testing was conducted; all enrolled students commenced in the project,

but there were some withdrawals due to the normal factors causing attrition, thereby reducing the size of the sample. The small sample size meant it was unlikely that anything more than trends could be reported; but the unique situation at USQ in being the only Australian university at the time of the testing to offer aural training in both internal and external modes meant that the project was an important initial step in researching the comparative effectiveness of the two modes of tuition and learning.

The strong ceiling effect has been noted in some of the questions. This effect resulted from individuals with high pre-test scores being restricted in scope for improvement relative to individuals with lower pre-test scores, indicating that the question did not include sufficient depth or breadth to differentiate between levels of ability, and was therefore unable to reveal trends in the results. The problem lay most clearly in Groups A and B. The audition requirements met by these students for entry into the Certificate or Degree programmes in which the subjects were enrolled presume a considerable amount of previous musical experience; consequently, for many subjects in these two groups, Questions 3 and 4 were too easy, and the same problem was also evident for rhythm (a) in Question 1 and for melody (a) in Question 2. The inclusion of some less challenging test material was intentional, however, in order to include material within the reach of subjects in Group C, whose musical background was less certain, in order for them to act as an effective control in the study.

Another consideration is that, even though the training material utilised both ascending and descending intervals, the research test featured only ascending intervals. Given that the literature reports differences in the perception dependent on interval direction (Bentley, 1973; Radocy, 1978a) and the tessitura of the pitch (Shatzkin, 1981), it would have been preferable in the research test to include intervals in both directions, and to have some intervals commencing on a note other than middle C. As well, the structure of Question 4(a), in which subjects were required firstly to judge for three pairs of intervals whether each pair was the same or different, and then secondly to state whether the second interval of each pair was wider, contributed to weakening the validity of the question. Rather than dividing the question into parts in this manner, it may have been better to use separate questions to assess the different aspects under scrutiny. In this way, if the “same/different” aspect still elicited responses which gave rise to a ceiling effect, the effect would not compromise the value of the identification responses.

Some limitation was also apparent in the research design, particularly with respect to the self-rating questions. As it stood, if students who were learning and improving could

accurately recognise and gauge their increasing ability, it could promote confidence and motivate them in their study; however, if the students *were* hearing well but could not accurately recognise their improvement, they could lose motivation. Given that lack of confidence is suggested as a possible primary reason for inaccurate responses (Radocy, 1975), and the possibility revealed in the results of this study that personality traits may also be a contributing factor to how students would rate their ability, it would not be unexpected for students to rate themselves somewhat lower than their actual ability level, thereby adversely affecting the validity of the responses. A simple way to address this limitation would have been to conduct interviews with each subject following the testing. Such interviews would have allowed for more detailed investigation of the variety of factors that might affect subjects' responses, such as sleep deprivation or the like (Simmonds, 1978), and would have yielded data which may have been more useful in revealing trends more clearly.

The demographic data gained from the survey was useful; however, it may have been desirable to include an additional question. The question was put whether any participant had a hearing condition, and whether the condition was temporary or permanent; but another specific hearing "condition" exists which now is unknown to have affected the results, that is, absolute pitch. The likelihood is that very few, if any, of the participants would have possessed absolute pitch, so the results may not have been very, if at all, different; but it appears at this point in time to have been an oversight.

6.4 Recommendations and Suggestions for Further Research

A number of recommendations and suggestions for further research arises from the findings, and some are suggested also by the limitations: the ceiling effect referred to in section 6.3 is strongly suggestive, for example.

The first recommendation relates to interval recognition, as this was possibly the most problematic question of the test. Of the 16 subjects in Group A, 11 (68.75%) registered a difference of zero, two subjects (12.5%) a difference of +0.5, and two subjects (12.5%) a difference of -1.5 – all representing an insignificant change in performance. A single subject only, A1 (6.25%), registered a noticeably larger difference of +3. The 11 subjects registering no difference all achieved the maximum possible score in both the pre-test and post-test, leading to a strong ceiling effect that compromised the power of the question to reveal any useful statistic. This effect, coupled with the recognition of common interval identification

errors reported in chapter 5, indicates that a revision of content and a change of teaching strategy for interval recognition might be advisable.

Also in relation to intervals, Shatzkin (1981a) found that "context may either enhance of interfere with identification of an interval". He also found that intervals heard in context were best identified when they were in the first position but least well identified when they were in the middle position, an effect of the serial memory curve. In addition, distracter tones either before or after the tested interval interfered with results, the distracters close in frequency and time causing the most interference. Shatzkin also noted further complications, finding that white key notes are more easily recognised than black key notes, and that the higher the pitch, the easier the recognition of intervals. More research is needed to isolate these variables.

Further research by repeating the current study in a revised format with subsequent class groups of *Music Craft 1* would help to determine the validity of the results obtained in this original study. Additionally, further research into results for groups in *Music Craft 2-6* would help to determine if the trends are maintained in the more complex aural tasks undertaken in subsequent courses of the programme.

Internal students have always been expected to complete homework and to carry out private practice on aural skills between classes, but this seldom occurs unless closely structured guidance is given, and even then not as frequently as necessary or desired. Reasons for this vary, but are mostly related to time constraints that students nowadays experience. These constraints include study and assignment preparation for other subjects; attendance at rehearsals, sometimes for several ensembles, especially as a major production approaches (e.g., an opera or oratorio); and, increasingly, as more students are driven to paid employment to fund their accommodation and/or HECS bills, workplace schedules. Some employers are understanding of students' needs, but others are quite rigid in their demands and students fear losing their employment and income if they do not meet these demands; rightly or wrongly, some flexibility is consequently expected of the educational institution.

Because the better performance or rate of improvement amongst the external students (Group A) could be a result of the ready-made structure of the CD-ROM exercises, it has been decided since the completion of the research project that internal students should purchase the external package so that they will be able to complete the exercises on the CD-ROM between classes, enabling them to structure their private study time. Although the same time constraints continue to be a distraction, it appears that the structured nature of the CD-

ROM is an incentive to private practice, and that students consequently feel more secure of their progress. A follow-up study comparing the achievements of internal and external Music Craft students under these new conditions could well be useful and informative.

A potential difference in attitude between late-teenage students and students further advanced in years and life experience is a possible factor contributing to different group achievements in melodic perception. Given the increasing promotion of lifelong learning, further research on age-related learning outcomes in music and other disciplines could yield useful information for course designers.

A factor which possibly contributed to improvement in scale/mode recognition was the singing exercises which were included as part of the training, but this could not be verified in the current study. It may have been possible to ascertain information in relation to this proffered connection had interviews with the project participants been conducted following the administration of the post-test.

The self-rating process would have been an opportunity to test in some capacity, too, the suggestion that the effect of aural training by programmed instruction generalised to sightsinging ability (Carlsen, 1969). As a discreet pre-test/post-test measure, the question may have limited value; but when viewed in combination with actual achievement, some useful trends could be suggested. Additionally, the need for research into a suitable method to test sightsinging of external students is a further area requiring research.

This evaluation of a tertiary-level distance-mode aural training programme has found that such a programme is effective, and shows that it need no longer be considered for face-to-face tuition in this aspect of music education to be mandatory, especially if the issue of sightsinging instruction and assessment for external students is addressed. The ramifications for tertiary music institutions which increasingly face the restrictions demanded of them by the economic rationalists conducting the “business” of education are plain, and are potentially far reaching. For those who are passionate about education and care about the extra-mural, holistic purposes of education and learning, it is of some comfort to know that a reduction in face-to-face teaching in academic music subjects need not mean that the development of the students is compromised.

Appendix A

Introductory Book, *Music Craft 1*: Relevant Pages

Module B outline – Aural training

The development of inner hearing is fundamental to all musicians and music teachers. The exercises in the first semester's aural development focus on the development of rhythmic, pitch and melodic perception. This is carried out through listening to rhythms and melodies and writing them after hearing them played, mostly, three times. (The dictation element assists in the development of musical memory.) Pitch perception is also developed through listening to scales and modes and recognising the sequencing of the intervals that determine the kind of scale or mode. Interval recognition in separate exercises also helps in the development of pitch perception. Underpinning all pitch work is encouragement to sing aloud. Scales, modes and intervals should be sung. Part-singing is also introduced in this semester through the inclusion of canons. This will assist in developing the ability to hear more than one part in any musical work.

Music Craft 1 – Aural training 1

This module develops aural acuity relating to pitch, melody and rhythm. Pitch work deals with formation and recognition of scales and modes, and with a sequential development of interval recognition. Melody work deals with mostly stepwise and triadic movement; while rhythm work fosters an ability to think in rhythmic courses, and to develop a shorthand notation so that four-bar rhythms can be notated rhythmically, accurately and quickly. The inclusion of canons assists in the development of the ability to hear two or more parts simultaneously.

Music Craft 2 – Aural training 2

This module further develops aural acuity in relation to pitch, melody and rhythm, and introduces concepts in relation to harmony and form. Melodic work makes greater use of small leaps, while rhythm work will extend to sixteen bar rhythms. Simple formal structures – binary, rounded binary and ternary will be introduced.

Music Craft 3 – Aural training 3

This module further develops aural acuity relating to pitch, melody, rhythm, harmony and form. Additionally, two-part work using treble and bass clefs will be introduced. Modulations to closely related keys are introduced within the context of simple forms.

Music Craft 4 – Aural training 4
This module further develops aural acuity relating to pitch, melody, rhythm, three-part work, dynamics, harmony and form.

Music Craft 5 – Aural training 5
This module further develops aural acuity relating to pitch, melody, rhythm, harmony and form. Four part work in vocal style is introduced, along with dynamics, and phrasing and articulation.

***Music Craft 6* – Aural training 6**
This module, in addition to further development of previously mentioned skills, deals with multimetric rhythm and orchestral dictation.

Practical matters and assessment for Module B

You are required to have access to a multimedia computer that will enable you to complete aural exercises supplied to you on CD ROM. The CD will have sets of exercises planned for each week of the semester. It will provide a balanced progression through all of the exercises so that you can progress systematically in all areas of development. A description of one of these assignments follows.

You will be required to submit assignments during each semester so that we can help you measure your progress.

Assessment will be carried out in the designated assessment period at the end of each semester. It will consist of an examination in which you will be given test items similar to the exercises you have completed during the semester. For this assessment you will need to provide your own CD player and set of headphones. Please note that while the exercises are on a CD ROM to be used on your computer, the examination will be on a normal audio CD suitable for playing on a normal CD player. All instructions for this examination will be spoken and included on the CD. We stipulate that you use your own CD player and headphones so that you are familiar with their operation. The headphones are required so that you will not disturb other examination candidates who may be doing completely different examinations. The University will not be responsible for any malfunction of equipment or for any equipment that does not replay the examination CD accurately. You must be responsible for this yourself. This is pedagogically and musically sound. You will appreciate that in all aspects of musical life the musician has the personal responsibility of ensuring the best conditions for musical performance. The assignments, on audio CD, will be provided with the set of study notes so that you will be familiar with what will happen in the examination. The completion of the exercises on this CD will form the basis of your mid-semester assignment.

You are reminded to refer frequently to the relevant sections of the *Department of Music handbook (external)*.

Module B: aural training – information and procedures

This form of instruction may be new to you. You may find it strange at first, but it is hoped that you will understand the processes quickly and benefit from your study. As this is a relatively new way of improving your aural acuity we are anxious to help you if you have difficulty. Please contact us through the usual channels as soon as a difficulty emerges. Don't let problems continue to the extent that you become completely frustrated.

The value of aural development

We consider aural development as the foundation of all musical development. The basis of any music making and listening is the ability to listen and to hear. The value of aural development is that it makes it possible for a musician to listen and to hear! Many of the people doing this academic program are involved in teaching music. We believe it is essential that teachers themselves have the best possible aural acuity so that students will have the benefit of someone who is going to provide excellent support for their aural ability. No matter what instrument a person plays, the abilities to listen and to hear are fundamental. Without them, the creative expression is simply less effective.

Elements of aural development

This module (and the subsequent modules) is designed to help you to develop your aural acuity across a range of elements. An initial code is given after naming the element. This code will be used frequently when referring to the exercises. The elements are:

1. **Rhythm Dictation (RD)** – becoming aware of rhythmic structures and memory training
2. **Pitch Recognition (PR)** – singing a variety of scales to assist in recognising the context in which melody is found
3. **Interval Recognition (IR)** – becoming aware of pitch relationships
4. **Singing (SG)** – using your voice as a fundamental medium in aural development
5. Canon (CN) – a first step in singing in two or more parts that leads to melodic and harmonic awareness
6. **Melodic Dictation (MD)** – placing pitch relationships in a melodic (and rhythmic) context, and training the memory
7. **Phrasing and Articulation (PA)** – being aware of the way in which music is shaped and the way in which sounds are made
8. **Cadence Recognition (CR)** – understanding the 'punctuation marks' of music
9. **Chordal Progression (CP)** – being aware of the sequence of harmonic vocabulary
10. Two-part Dictation (TP) – being able to hear and memorise two parts independently
11. Four-part Dictation (FP) – being able to hear and memorise four parts independently and
12. Orchestral Dictation (OD) – being able to hear multiple parts involving different timbres and textures.

Not all of these elements will be treated in each semester. Some of them will be added progressively as you move from semester to semester.

There is a section on assessment below. However, it is important to state here that it is vital you work systematically through the CD in the order suggested. The exercises are sequential and we have tried to provide you with a balanced diet of elements. Not all of the elements will be (or can be) assessed through distance education, but you will become immediately aware that many of the elements are integrated. We will not, for example, be able to assess your singing ability in Canons. You will be aware, though, that the more you practise the singing of canons accurately, the more readily you will be able to handle melodic dictation and two part dictations – elements that are assessable.

Supplementary material

There are two very good programs that may help you in your work if you wish to make use of them. They are not cheap but you may be able to purchase them, or you may know of someone who has them (a high school, for example). They will certainly assist you in developing a foundation for the work in this course. The more solid the foundation, the better the building!

Auralia – from Rising Software – <http://www.risingsoftware.com/auralia/>

Tomasz Spiewak, *Aural Training for Musicians and Music Students*, Box Hill College of TAFE Victoria, Australia

Using the CD

The chart on page 15 shows the elements in the course and the order of progression. You are urged to work at your aural development each day – about four and a half hours each week, depending on your own abilities.

You should find it quite easy to navigate your way around the CD-ROM. Once you are familiar with it, you will realise that, even though the exercises are presented in a particular sequence, and it is advisable at least broadly to follow the sequence, you are not confined to that sequence. You are able to manipulate the way in which you approach the exercises, which may enhance the learning process for you. For example, if you learn well visually, you may like to use the answer screen of a Melodic Dictation as a sight singing exercise, and after completing some other type of exercise in the intervening time, come back to the original melodic exercises to complete as a Melodic Dictation. Likewise, you may find it useful to clap the rhythmic exercises before completing them as dictations. It is important to keep in mind, though, that the assessments will be completed strictly as dictation work, and you should work towards this end.

Be patient and be persistent!

You will need your own manuscript book or paper to write the answers to many of the questions. It is suggested that you have one book for each semester and that you divide it into sections corresponding to the elements. This way you will be able to see the increased level of difficulty as you progress. (You may want to devise your own loose-leaf system.) The elements for which you will need manuscript paper are: rhythm, intervals and melody dictation.

A big advantage

There is one big advantage about working from a CD over working in a normal classroom. That is, that we have been able to simulate a range of instruments in the exercises. Very often, this form of work is carried out only through the voice and the piano. For the CD, over the six semesters we are able to use a variety of instruments in a variety of clefs – a much closer integration with what actually happens with 'real' music. For example, the rhythm work is done using a drum. Melodic, two part work and the other elements use a number of instruments. This provides a wide range of aural activities. For example, when listening to an orchestral CD we hear an oboe and flute as a duo, rarely do we hear just two parts on the piano. In the past, so much of aural training has been carried out using only the treble clef. And, it won't be a surprise to almost half of the musicians in this world that their vocal range is in the bass clef! However, in first semester, we've had all of the exercises played on a keyboard and in the treble clef.

About the exercises

The chart on page 15 indicates how the elements are structured and how the exercises are sequenced. At the bottom of each screen of the exercise, when you click on 'next exercise' you will be taken automatically into the next exercise in the sequence. If you need to repeat the previous exercise, simply re-access the exercise you want and do it again. There is no problem about doing an exercise any number of times until you get it right. What you must do, however, is work toward getting exercises correct eventually within the number of playings provided. It is this limited pattern which will be given in the examination. Remember, we aim to help you develop aural acuity. Part of this acuity is the ability to recognise music quickly. In a performance, for example, once a sound is heard it is gone! The more we hear of the sound and the more quickly we recognise it, the more we will get out of the performance.

Having said that you should do the exercises sequentially, you may find it useful occasionally to do, say, four rhythms in a row in one week when you are 'on a roll'. If this happens, the computer will record the fact that you have completed that exercise so that when you go back into the sequence and come to that exercise, the program will automatically send you on to the next exercise you haven't completed.

The procedure each week

The academic program is divided into weeks. Whilst the semester is 13 weeks long, there are 14 weeks of exercises, allowing you some revision before the examination. Our aim is to start from a basic conceptual level in each of a number of elements and continue to develop progressively across those elements. The principles and the practice of each of the elements used in Semester 1 are described below.

Rhythmic Dictation (RD)

There are ten exercises each week – two a day for five days. In Semester 1 they are all in 4/4 time. They commence with a length of four bars and simple rhythms and progress to six and then eight bars with the gradual addition of more complex rhythm patterns as shown in the table below.

Week	Length	Rhythmic element's used	
1	4 bars		(heard twice)
2	4 bars		(heard twice)
3	6 bars	As Week 2	(heard twice)
4	6 bars		(heard three times)
5	6 bars	As Week 4	(heard three times)
6	6 bars		(heard three times)
7	8 bars		(heard three times)
8	8 bars		(heard three times)
9	8 bars		(heard three times)
10	8 bars		(heard three times)
11	8 bars		(heard three times)
12	8 bars		(heard three times)
13	8 bars		(heard three times)

The rests in the above are there to keep the rhythms in crotchet units. In the aural exercises you will also have rests commensurate with each of the rhythm elements – minim rests, crotchet rests etc.

Each rhythm (except for weeks 1 and 2) is played three times with a timed pause of 30 seconds between each playing. At the end of the third playing the exercise will stop and you have time to complete your work. If you have problems getting it right, simply click on the play button and you will hear the three playings again. When you have written the answer, click on the answer button and the score will open, allowing you to check your answer.

As far as possible, try to memorise groups of notes rather than individual. Also try to recognise recurring patterns or differences between similar patterns, as you normally would when listening to any music.

Here are some ways you can develop your own shorthand in writing rhythms. It is important that you experiment with each of the methods described below, and use the one (or combination) that works best for you. Each method is based on the premise that actual notation is time consuming, and that the swiftest and most accurate method you can develop will be the best. The various methods therefore aim to reduce the notation itself to a minimum, while as much information as possible is written down.

Method 1

This is a visual/spatial approach, using oblique strokes or dots to represent the note heads. These will be grouped into visually discrete crotchet units, with note heads spaced appropriately within the course.

For example the rhythm:

would be written thus:

.... with stems and beams added later to render a conventional notation.

Method 2

Write the stems only, but spatially within crotchet units as for Method 1. Beams can be added, giving all the required information, and lastly note heads can be included. The rhythm above would be written thus:

which, with beams added, would read:

Method 3

Prepare a vertical stroke for each crotchet unit. The rhythm is then written through the vertical stroke by using oblique strokes, as shown below. The longer the note value, the longer the stroke:

Principles

The first principle is that you should write rhythmically, that is, with pen strokes sounding on the paper in the same rhythm as that which you are notating. This will reinforce the rhythmic pattern on your mind and simplify the thinking and writing processes for you.

The second principle is to write as fluently as possible so that the maximum amount of rhythmic information can be notated in one playing. Always maintain a monotone count (softly) out loud to assist you in discerning the crotchet unit as a pulse. If you miss a beat or two, don't give up, but continue at the beginning of the next bar.

Pitch Recognition (PR)

This is fundamental to all aural development. Sing as much as you can. For each exercise in this element, click on the exercise, listen to the starting note and sing the scale (from C) slowly with the music. Ideally do it without the score first and then with the score. Listen carefully to what you hear and what you sing. We start with the major scale and progress through pentatonic, minor (harmonic and melodic forms) and whole tone scales, modes and then scales in other keys. Where there is no starting note, start singing the first note as soon as you hear it and proceed through the exercise.

Interval Recognition (IR)

There are 20 exercises each week in this element. You should do about four exercises each day. You should sing and listen to the exercises. In the first week, the only intervals are Perfect 4th, Perfect 5th and Perfect octave. In the second week these intervals are retained and others added – viz Major 2nd, Major 3rd, Major 6th and Major 7th. In the third week we cover minor 2nd, minor 3rd, minor 6th and minor 7th. For some weeks they start from C with the second note shown. Initially, the first note is always middle C. Again, the principle here is that we are trying to help you recognise the pitch basis for music by starting with fairly basic intervals on a standard foundation. The use of C will help you to hear the relationships in a tonal context. As we start to extend the range and the starting note. After that they can start from any note with the second note being above or below.

Singing (SG)

The purpose of this element is to develop your inner hearing through improving your 'outer hearing', by working on developing an accurate (in tune) aural memory for important pitch patterns – scales, modes and intervals – and by singing them in tune. As you work through each exercise, be conscious of the patterns of tones and semi-tones in use, and ensure you sing all tones and semi-tones exactly in tune. Work to create these intervals consciously.

In the first week this is the same as for pitch. All you do is to click on the exercise, listen to the starting note and sing the major scale (from C) slowly with the music. Do it without the score first and then with the score. Listen carefully to what you hear and what you sing. When you

have done that three times each day, move to the second exercise. This is a C pentatonic scale. Follow the same procedure. Again, listen to what is given and sing slowly. Do you recall the notes of the pentatonic scale? It is the major scale with the absence of the 4^{th} and 7^{th}.

In the second week, we diverge from the pitch element but still retain some integration. You are given the major scale with intervals. When you click on the exercise you will see that you are asked to sing the tonic note (C) and then the intervals alternating from C. In later weeks, we add new intervals and new scales – including modes. The names of the scales and the modes added are included at the beginning of the exercise.

Melodic Dictation (MD)

This is not dissimilar to the procedure for rhythm dictation. The exercises all use treble clef, and are played six times with 30 second intervals between the playings. The melodies intentionally start with the well-known and move to 'originals'. They are sequentially developed forming on specific intervals and expanding. To help you work on the pitch alone, for the first five weeks you are given a start by having the rhythm provided.

Canon (CN)

This is a little tricky but musically rewarding. Each week you are given a three or four part canon. The procedure for working with the canon is the same each week. The progression comes through the fact that the canons become harder as the semester progresses.

Day 1
You should play the canon five times so that you can memorise it completely. (If it takes more than five playings, just click on the button again.) You can use both the written score and the aural performance to learn the canon.

Day 2
You might want to make the first playing a refresher to make sure you have it correct. Then play the Canon again but this time, start singing the canon at the second entry point. This is indicated by '2' in the score. You will thus be singing the canon with the computer. The Canon is designed to have the first part go through once and a bit to enable you to sing the complete canon yourself when you sing the second part.

Day 3
Play the Canon which has two parts, and sing the third part that commences where '3' is indicated in the score. Again, the first two parts are played more than once to enable you to sing completely through the canon as the third part. The piano is used for all canons in semester 1.

Days 4 and 5
When the canon is in 3 parts, simply repeat the singing of the third part with the computer for days 4 and 5.

When the canon is in four parts, sing the fourth part against the 3 parts given on the computer on Day 4.

On Day 5, sing the fourth part with the four parts given on the computer.

If you are weak at holding a part, you may prefer to sing with one of the computer-generated voices rather than against it. As you develop more confidence, you should try to hold your own part against those provided by the computer.

Special note about canons

Sometimes, you will need to sing more than the complete canon to enable you to finish at an appropriate place in the canon. The rule of thumb is, keep singing until the score you are singing against runs out. Each canon in the semester is presented in the same way as indicated above.

Summary

That's it as far as the directions are concerned. In some ways trying to tell you how to proceed is harder than the exercises themselves. You are, after all, not unused to aural training. However, you are reminded this is just a new way of doing it. Procedures will be kept as consistent as possible. You may need to spend some additional time initially to get into the swing of things but once you are there, you will find your aural acuity developing very quickly. Now, a final word about your assignment and assessment.

Assignments and assessment

Because the way of doing this is different we are linking the assignments and the assessment together. In other words, your assignments are a simulation of the exam you will do at the end of semester.

With this package are audio CD's that can be played on your normal CD player. They can also be played on your computer as you can with any normal audio CD. The assignment CD's will consist of four parts: Rhythm Dictation, Pitch Recognition, Interval Recognition and Melodic Dictation.

Rhythm Dictation (RD)

You will be given a rhythm that includes the components that have already been included in your weekly procedures to the time of the assignment's Due Date. (This is one good reason for keeping up-to-date with your weekly exercises.) It will be played in a similar way to the rhythms for your exercises.

Pitch Recognition (PR)

You will be given five questions in which five scales and/or modes will be played twice each. You will be required to name the exact form of the scale or mode (although you won't be required to name the starting note.) This is why it is so important that you learn to sing with the scales so that you become physically involved.

Interval Recognition (IR)

There will be two parts to this question. In the first, 10 intervals will be played twice each and you will be required to name each interval.

Melodic Dictation (MD)

One melody will be played six times.

In all cases above, the order of difficulty will be similar to that found in the exercises up to the due date of the assignments.

The assignments count towards your final grade in the course. It is important that you treat each assignment as an examination. Please follow the procedures exactly and submit it as requested. We need to know how you are progressing (as you do) as this is an important way

we know how you are handling the work. **You must submit the assignments. A grade cannot be awarded unless the assignments are received.**

Your **end of semester examination** will be presented in exactly the same way. You will be required to take a CD player with headphones to the examination room. The headphones are required because it is probable that examinations in other subjects will be held concurrently with yours. You will be given an audio CD. At the commencement of the examination, the supervisor will give you the CD and you will be required to commence immediately. There will be a short section (perusal time) in which you will be able to check that everything is working correctly. Supervisors will be given the usual instructions that the examination will last for the specified time. The CD will progress through the questions in the normal sequenced manner and end at the published time when you will be required to stop. (Please note that if you do turn the CD off during the examination, or try to repeat a section, you will not be able to complete it in the allocated time. This means that you will not be able to complete all the questions and you will be penalising yourself through having to achieve a pass with limited maximum marks.)

Finally, please be aware that it is your responsibility to ensure that you have a good quality CD player to use for your examination. You will be familiar with its operation and this should present no problems. Manuscript paper will be provided. No other examination book will be needed. Mark the questions clearly on the paper.

Finally

Good luck and good *listening*. We trust that you will also be able to *hear* better at the end of course!

The exercise chart – semester overview

Please use the key for recognising the elements from the initial code.
The figure in each cell refers to the number of exercises each week.

	RD	PR	IR	SG	CN	MD	IT	PA	CR	CP	TP	FP	OD
Week 1	10	2	20	2	1								
Week 2	10	2	20	3	1								
Week 3	10	2	20	5	1								
Week 4	10	3	20	8	1								
Week 5	10	5	20	13	1	1							
Week 6	10	12	20	13	1	1							
Week 7	10	13	20	1	1	1							
Week 8	10	14	20	3	1	1							
Week 9	10	15	20	4	1	1							
Week 10	10	16	20	5	1	1							
Week 11	10		20	6	1	1							
Week 12	10		20	6	1	1							
Week 13	10		20	6	1	1							
Week 14	10		20	6	1	1							

RD – Rhythmic Dictation
PR – Pitch Recognition
IR – Interval Recognition
SG – Singing
CN – Canon
MD – Melodic Dictation

PA – Phrasing and Articulation
CR – Cadence Recognition
CP – Chord Progression
TP – Two- or Three Part Dictation
FP – Four Part Dictation
OD – Orchestral Dictation

Study materials

Study package

There are four components of the study package:

- **Introductory book.** This is what you are reading now. It contains details about how to study the course, the study schedule, and it also includes details about your assignments. Make sure you read your introductory book thoroughly. It will answer many of your questions about the course.
- **Study book.** This book presents the content for Module A, and is a detailed guide to your reading and learning in the course. It provides you with information, self-assessment activities to carry out at home, or in study groups. It tells you what to listen to, what reading to do and what exercises to do.
- **CD-Rom.** This provides the exercises for Module B that you will complete in assisting your aural development.
- **CD Audio.** This contains the audio assignments to be completed during the semester.

External students

You are supplied a package from the Distance and e-Learning Centre. If anything is missing from your package please contact Outreach Services immediately. (See procedures in the *Distance Education student guide*.)

Materials you must buy

Hindemith, P 1968, *A concentrated course in traditional harmony book 1*, Schott, New York.

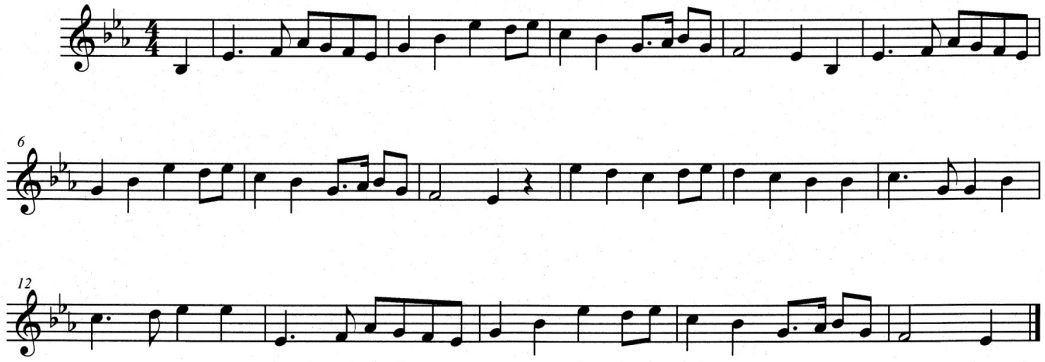
Kostka, S & Payne, D 2004, *Tonal harmony*, 5th edn, McGraw Hill, New York. (The 1995 third edition and 2000 fourth edition of this book can also be used.)

Appendix B

CD-ROM of Exercises: *Music Craft 1*

Appendix C

Sample Melodic Dictation: Week 11



Appendix D

Sample End-semester Examination (EXT):Target Responses Included

STUDENT NAME: _____			*STUDENT NO.:* _____
UNIVERSITY OF SOUTHERN QUEENSLAND			
FACULTY OF ARTS			
Course No: MUS1021		**Course Name:**	**MUSIC CRAFT 1 MODULE B**
Assessment No:	Internal [ ] External [X]		**This examination carries 30% of the total assessment for this course**
Examiner:			**Moderator:**
Examination Date:	JUNE 2007		
Time Allowed:	Perusal – Ten (10) minutes Working – Thirty (30) minutes		

Special Instructions:

This is a **RESTRICTED** examination.

Students may bring writing equipment (but not paper); portable CD player and headphones into the examination room.

Students are to write name and number on examination paper.

One (1) sheet of music manuscript paper is attached at the end of this examination for working purposes. Answers should be written in the spaces provided.

Students **are** permitted to write on the examination paper during perusal time.

All examination question papers must be submitted to supervisors at the end of every examination and returned to USQ.

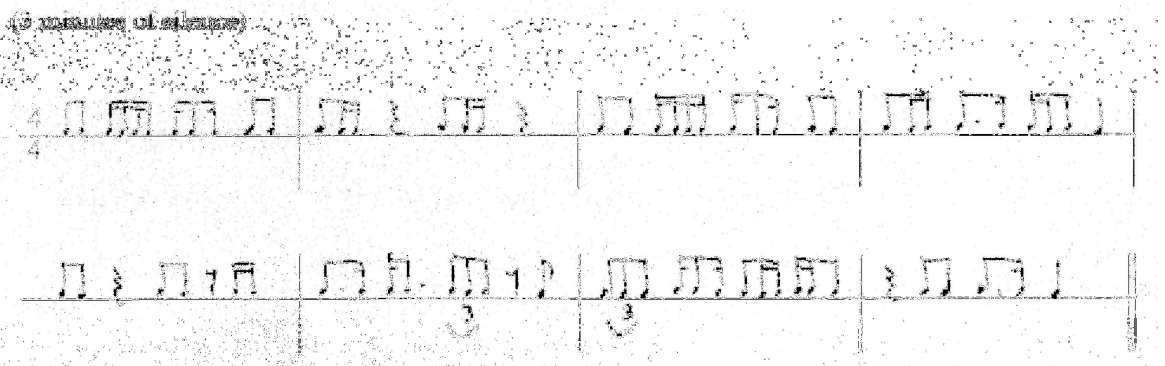
QUESTION 1 **Rhythmic Dictation**

You will hear one rhythm played 3 times, with 30 second pauses in between each playing. You will have three minutes at the end of the playing in which to finish your answer. You will be given a reminder that Question 2 is about to commence, 10 seconds before it commences.

The rhythm is eight (8) bars long and is in 4/4 time. One complete bar of pulse will be given before the commencement of the rhythm.

Here is the first playing. (1st playing)
Here is the next playing. (2nd playing)
Here is the last playing. (3rd playing)

(3 minutes of silence)



QUESTION 2 **Scale and Mode Identification**

Five scales or modes will be played. Each will be played twice. There is a 15 second gap between each playing. You will be given 30 seconds at the end of the playing before the next example is performed. You will be given a reminder that the next example is about to commence, 10 seconds before it commences and again before the commencement of Question 3. You should identify what scale or mode it is. The choice is from major, harmonic minor, melodic minor and wholetone scales, and Phrygian, Lydian, Mixolydian and Dorian modes.

(i) Major (ii) Wholetone (iii) Lydian (iv) Melodic minor (v) Mixolydian

QUESTION 3 **Intervals**

Ten intervals will be played twice each, with only a short pause between each playing. A pause of 15 seconds will be made between each exercise. You should identify the correct interval by naming it as Perfect 4th, or Major 3rd etc.

Here is the first exercise. 1 (Two playings)
Here is the next exercise. 2 (Two playings)
Here is the next exercise. 3 (Two playings)
Here is the next exercise. 4 (Two playings)
Here is the next exercise. 5 (Two playings)
Here is the next exercise. 6 (Two playings)
Here is the next exercise. 7 (Two playings)
Here is the next exercise. 8 (Two playings)
Here is the next exercise. 9 (Two playings)
Here is the last exercise. 10 (Two playings)

(i) minor 6th (ii) perfect 5th (iii) minor 7th. (iv) aug. 4th (v) perfect 8va

(vi) major 6th (vii) major 2nd (viii) minor 3rd (ix) perfect 4th (x) minor 2nd

QUESTION 4 **Melodic Dictation**

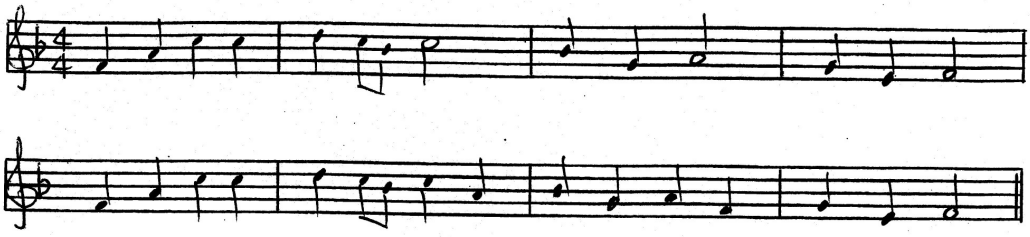
For the final question you will hear one melody played six times, with 30 second pauses between each playing. You may have up to three minutes after the final playing to complete your answer.

The melody is in F major, in four/four time, and is eight bars long.

Tonic chord is sounded before each playing.

Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third playing. (3rd playing)
Here is the fourth playing. (4th playing)
Here is the fifth playing. (5th playing)
Here is the last playing. (6th playing)

(3 minutes of silence)



Appendix E

Aural Audition Test: Blank Copy

UNIVERSITY OF SOUTHERN QUEENSLAND
AURAL AUDITION

Time allowed: 15 minutes

CANDIDATE'S NAME:_____

AUDITION DATE: _____

Question One: Identify the intervals that are played. Please state quality (major, minor, perfect) and size (3rd, 4th, etc). Each interval will be played **twice**.

(i)	(iv)
(ii)	(v)
(iii)	(vi)

Question Two: For each of the following chords, state the tonality (major, minor, augmented, diminished) and the position (root position, first inversion etc). Each chord will be played **twice**.

(i)	(iv)
(ii)	(v)
(iii)	(vi)

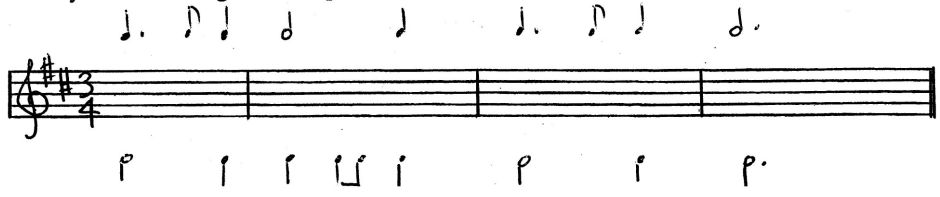
Question Three: Identify the following cadences as Perfect, Plagal or Interrupted. Each cadence will be played **twice**.

(i)	(iii)
(ii)	(iv)

Question Four: Write the chord progression, which will be played to you **five** times:

___ ___ ___ ___ ___ ___ ___ ___ ___

Question Five: On the stave provided, notate the two-part phrase, for which the rhythm has been given. The phrase will be played **four** times.



Appendix F1

Research Test: Blank Copy

AURAL MUSICIANSHIP TEST

STUDENT'S NAME: _____

In this test there are four (4) questions. You should listen to the questions carefully and complete the answers as directed. The CD is designed as the complete test in itself, with appropriate timed silences between the playings of the various questions. You should complete the questions without stopping the CD.

Use this test paper for answering the questions. Complete your answers in pencil, preferably 2B. You may use an eraser as necessary.

If you do not know the technical name/s to answer any question, please leave a blank.

Please answer these questions by circling the most appropriate answer.

How would you rate your ability in the following areas?

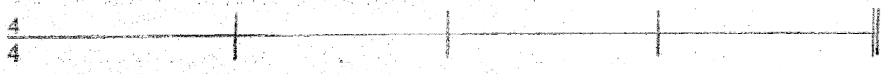
(a) rhythmic perception?	**very good**	**good**	**fair**	**poor**	**very poor**
(b) melodic perception?	**very good**	**good**	**fair**	**poor**	**very poor**
(c) interval recognition?	**very good**	**good**	**fair**	**poor**	**very poor**
(d) scale / mode recognition?	**very good**	**good**	**fair**	**poor**	**very poor**
(e) singing in tune?	**very good**	**good**	**fair**	**poor**	**very poor**
(f) holding a vocal part?	**very good**	**good**	**fair**	**poor**	**very poor**

Office Use Only

QUESTION ONE: Rhythmic Dictation

(a) You will hear one rhythm played 3 times, with 30 second pauses between each playing. You will have one minute at the end of the final playing in which to finish your answer. You will be given ten (10) seconds warning that Question 1 (b) is about to commence.

The rhythm is four (4) bars long and is in 4/4 time. One complete bar of pulse will be given before the commencement of the rhythm.



Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(b) You will hear one rhythm played 3 times, with 30 second pauses between each playing. You will have one minute at the end of the final playing in which to finish your answer. You will be given ten (10) seconds warning that Question 1 (c) is about to commence.

The rhythm is four (4) bars long and is in 4/4 time. One complete bar of pulse will be given before the commencement of the rhythm.

Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(c) You will hear one rhythm played 3 times, with 30 second pauses between each playing. You will have one minute at the end of the final playing in which to finish your answer. You will be given ten (10) seconds warning that Question Two (2) is about to commence.

The rhythm is four (4) bars long and is in 4/4 time. One complete bar of pulse will be given before the commencement of the rhythm.

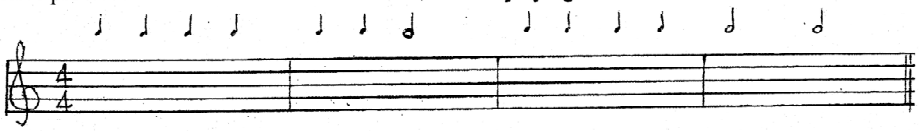
Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

QUESTION TWO: **Melodic Dictation**

(a) You will hear one melody played three times, with 30 second pauses between each playing. You will have one minute after the final playing to complete your answer. You will be given ten (10) seconds warning that Question 2 (b) is about to commence.

The melody is in C major, in 4/4 time, and is four bars long. The rhythm is given above the stave provided. The tonic chord is sounded before each playing.

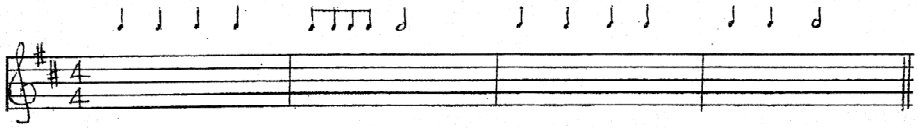


Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(b) You will hear one melody played three times, with 30 second pauses between each playing. You will have one minute after the final playing to complete your answer. You will be given ten (10) seconds warning that Question 2 (c) is about to commence.

The melody is in D major, in 4/4 time, and is four bars long. The rhythm is given above the stave provided. The tonic chord is sounded before each playing.

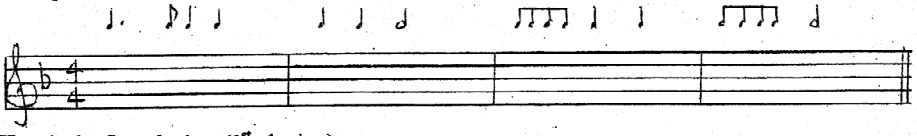


Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(c) You will hear one melody played three times, with 30 second pauses between each playing. You will have one minute after the final playing to complete your answer. You will be given ten (10) seconds warning that Question Three (3) is about to commence.

The melody is in F major, in 4/4 time, and is four bars long. The rhythm is given above the stave provided. The tonic chord is sounded before each playing.



Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

QUESTION THREE: Scale/Mode Recognition

(a) You will hear three pairs of ascending scales, played twice each, with a ten (10) second pause between each pair. In each case, the first scale will be the major scale. For each scale pair, please state whether the scale pairs are the same or different by circling the appropriate response. For each scale pair, write the name of the second scale in the space provided. (If you do not know the technical name of the scale, leave the space blank.)

(i)	***Same***	***Different***	_____
(ii)	***Same***	***Different***	_____
(iii)	***Same***	***Different***	_____

(b) You will hear three pairs of modes, played twice each, with a ten (10) second pause between each pair. In each case, the first mode will be the dorian mode. Please state whether the mode pairs are the same or different by circling the appropriate response. For each mode pair, write the name of the second mode in the space provided. (If you do not know the technical name of the mode, leave the space blank.)

(i)	***Same***	***Different***	_____
(ii)	***Same***	***Different***	_____
(iii)	***Same***	***Different***	_____

QUESTION FOUR: Interval Recognition

(a) You will hear three pairs of melodic intervals, played twice each, with a ten (10) second pause between each pair of intervals. A melodic interval is one note played after another. Please state whether the interval pairs are the same or different by circling the appropriate response. If the second interval is different, please state whether it is wider by circling the appropriate response.

(i) ***Same*** ***Different***

Is the interval wider? ***Yes*** ***No***

(ii) ***Same*** ***Different***

Is the interval wider? ***Yes*** ***No***

(iii) ***Same*** ***Different***

Is the interval wider? ***Yes*** ***No***

(b) You will hear five different melodic intervals, played twice each. There will be a ten (10) second pause between each interval. In the space provided, please identify the quality and size of each interval (eg Perfect 4^{th}, Major 6^{th}, Minor 7^{th})

(i)	
(ii)	
(iii)	
(iv)	
(v)	

THIS IS THE END OF THE TEST

Appendix F2

Research Test: Target Responses Included

QUESTION ONE: **Rhythmic Dictation**

(a) You will hear one rhythm played 3 times, with 30 second pauses between each playing. You will have one minute at the end of the final playing in which to finish your answer. You will be given ten (10) seconds warning that Question 1 (b) is about to commence.

The rhythm is four (4) bars long and is in 4/4 time. One complete bar of pulse will be given before the commencement of the rhythm.

Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(b) You will hear one rhythm played 3 times, with 30 second pauses between each playing. You will have one minute at the end of the final playing in which to finish your answer. You will be given ten (10) seconds warning that Question 1 (c) is about to commence.

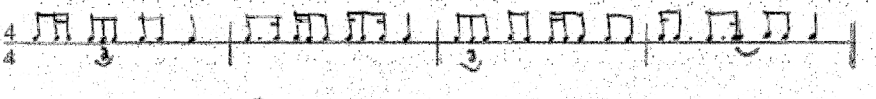
The rhythm is four (4) bars long and is in 4/4 time. One complete bar of pulse will be given before the commencement of the rhythm.

Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(c) You will hear one rhythm played 3 times, with 30 second pauses between each playing. You will have one minute at the end of the final playing in which to finish your answer. You will be given ten (10) seconds warning that Question Two (2) is about to commence.

The rhythm is four (4) bars long and is in 4/4 time. One complete bar of pulse will be given before the commencement of the rhythm.



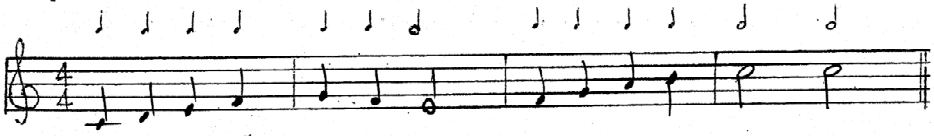
Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

QUESTION TWO: **Melodic Dictation**

(a) You will hear one melody played three times, with 30 second pauses between each playing. You will have one minute after the final playing to complete your answer. You will be given ten (10) seconds warning that Question 2 (b) is about to commence.

The melody is in C major, in 4/4 time, and is four bars long. The rhythm is given above the stave provided. The tonic chord is sounded before each playing.

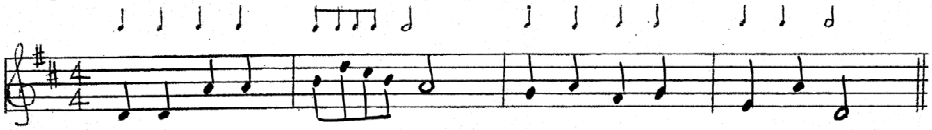


Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(b) You will hear one melody played three times, with 30 second pauses between each playing. You will have one minute after the final playing to complete your answer. You will be given ten (10) seconds warning that Question 2 (c) is about to commence.

The melody is in D major, in 4/4 time, and is four bars long. The rhythm is given above the stave provided. The tonic chord is sounded before each playing.

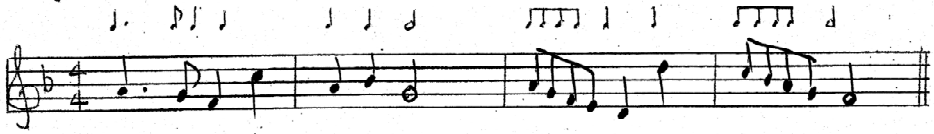


Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

(c) You will hear one melody played three times, with 30 second pauses between each playing. You will have one minute after the final playing to complete your answer. You will be given ten (10) seconds warning that Question Three (3) is about to commence.

The melody is in F major, in 4/4 time, and is four bars long. The rhythm is given above the stave provided. The tonic chord is sounded before each playing.



Here is the first playing. (1st playing)
Here is the second playing. (2nd playing)
Here is the third and final playing. (3rd playing)

(1 minute of silence)

QUESTION THREE: Scale/Mode Recognition

(a) You will hear three pairs of ascending scales, played twice each, with a ten (10) second pause between each pair. In each case, the first scale will be the major scale. For each scale pair, please state whether the scale pairs are the same or different by circling the appropriate response. For each scale pair, write the name of the second scale in the space provided. (If you do not know the technical name of the scale, leave the space blank.)

(i)	***Same***	***Different***	harmonic minor
(ii)	***Same***	***Different***	chromatic
(iii)	***Same***	***Different***	wholetone

(b) You will hear three pairs of modes, played twice each, with a ten (10) second pause between each pair. In each case, the first mode will be the dorian mode. Please state whether the mode pairs are the same or different by circling the appropriate response. For each mode pair, write the name of the second mode in the space provided. (If you do not know the technical name of the mode, leave the space blank.)

(i)	***Same***	***Different***	dorian
(ii)	***Same***	***Different***	phrygian
(iii)	***Same***	***Different***	lydian

QUESTION FOUR: Interval Recognition

(a) You will hear three pairs of melodic intervals, played twice each, with a ten (10) second pause between each pair of intervals. A melodic interval is one note played after another. Please state whether the interval pairs are the same or different by circling the appropriate response. If the second interval is different, please state whether it is wider by circling the appropriate response.

(i) ***Same*** (***Different***)

Is the interval wider? (***Yes***) ***No***

(ii) ***Same*** (***Different***)

Is the interval wider? ***Yes*** (***No***)

(iii) ***Same*** (***Different***)

Is the interval wider? (***Yes***) ***No***

(b) You will hear five different melodic intervals, played twice each. There will be a ten (10) second pause between each interval. In the space provided, please identify the quality and size of each interval (eg Perfect 4th, Major 6th, Minor 7th)

(i)	major 3rd
(ii)	major 6th
(iii)	major 2nd
(iv)	perfect 8va
(v)	major 7th

THIS IS THE END OF THE TEST

Appendix F3

Research Test: Audio CD

Appendix G

Informed Consent Form

INFORMED CONSENT FORM

I freely and voluntarily and without element of force or coercion, consent to be a participant in the research project entitled "The development and evaluation of a tertiary-level distance mode aural training program".

This research is being conducted by Phillip Gearing who is a postgraduate student of Dr Richard Swann in the School of Music at The University of Queensland. I understand the purpose of this research is to evaluate the effectiveness of a one semester of a developed aural training program for use with distance-mode students.

I understand I will be asked to respond to a paper and pencil questionnaire, which would take no more than five minutes. I understand I will be asked to complete a pretest and a posttest, with a total on-task time commitment of about 60 minutes. I understand I will receive no compensation for my time.

I understand my participation is totally voluntary and I am also able to suspend my participation at any time I wish. If I do not wish to participate or wish to suspend participation at any time in this research, my result for the Music Craft unit in which I may be enrolled before, during or after the project will not be affected. All my answers to the questions will be kept confidential. My name will not appear on any of the results. Only group findings will be reported and no reference will be made to any individual response.

I understand there is "no foreseeable added risk above the risks of everyday living" involved if I agree to participate in this project.

I understand there are benefits for participation in this research project. I will be providing music educators with valuable insight into the effectiveness of a distance-mode aural training program, and in identifying possible areas for improvement and refinement.

I understand that this consent may be withdrawn at any time without prejudice, penalty or loss of benefits to which I am otherwise entitled. I have been given the right to ask and to have answered any inquiry concerning the project. Questions, if any, have been answered to my satisfaction.

I understand that I may contact Mr Phillip Gearing through Dr Richard Swann in the School of Music at The University of Queensland (telephone 07 3365 4949) with any questions about this research or my rights. Group results will be sent to me upon my request when the final report is completed.

I have read and understand this consent form.

(Participant) _____ **(Date)** _____

(Witness) _____ **(Date)** _____

Appendix H

Demographic Survey

This study adheres to the Guidelines of the ethical review process of The University of Queensland. Whilst you are free to discuss your participation in this study with project staff (contactable on 07 4631 1108), if you would like to speak to an officer of the University not involved in the study, you may contact the Ethics Officer on 3365 3924.

Survey

Thank you for your participation in this survey. Please read the questions carefully and respond as fully as possible to all questions. Ensure your responses are completed in ink. Your responses shall be kept confidential and your anonymity protected.

If at any time there is a question you do not understand, please raise you hand, and the supervisor shall come to your place.

When you have finished the survey, please turn your survey paper face down on the desl in front of you.

The surveys will be collected by the supervisor when all participants have finished.

Please complete answers below. Circle answers where appropriate.

1. Please indicate your date of birth: **Day_____ Month_____ Year_____**

2. Please indicate your gender: **Male** **Female**

3. Please indicate the USQ degree program in which you are enrolled:

CertMusT **Assoc Deg** **BMus** **BMus/BEd** **BEd**

4. Please indicate you current Music Craft enrolment:

Music Craft 1 **None**

5. (a) Do you have a condition which affects your hearing? **No** **Yes**

(b) If Yes, is this condition **Temporary** **Permanent**

6. (a) What is your principal instrument (if voice, please indicate whether SATB)?

_____

(b) How long did you receive instruction for this instrument?

Years_____ Months_____

(c) Was this instruction consistent and regular?

No **Yes**

(d) (i) Have you completed formal, practical examination/s for this instrument?

No [*go to (e)*] **Yes**

(ii) What is the highest standard you have achieved?

Licentiate **Associate** **Gr 8** **Gr 7** **Gr 6** **Gr 5** **Gr 4** **Gr 3** **Gr 2** **Gr 1**

(iii) Please indicate the examining body:

AMEB **TCL** **ANZCA** **ABRSM** **Other_____**

(e) Are you currently receiving instruction for this instrument?

No **Yes**

proceed to page 2

7. (a) What is your second instrument (if voice, please indicate whether SATB; if none, write NONE, and proceed to Question 8)?

_____

(b) How long did you receive instruction for this instrument?

Years_____ Months_____

(c) Was this instruction consistent and regular?

No **Yes**

(d) (i) Have you completed formal, practical examination/s for this instrument?

No [*go to (e)*] **Yes**

(ii) What is the highest standard you have achieved?

Licentiate **Associate** **Gr 8** **Gr 7** **Gr 6** **Gr 5** **Gr 4** **Gr 3** **Gr 2** **Gr 1**

(iii) Please indicate the examining body:

AMEB **TCL** **ANZCA** **ABRSM** **Other_____**

(e) Are you currently receiving instruction for this instrument?

No **Yes**

8. How would you rate your ability in the following areas?

(a) rhythmic perception?	**very good**	**good**	**fair**	**poor**	**very poor**
(b) melodic perception?	**very good**	**good**	**fair**	**poor**	**very poor**
(c) interval recognition?	**very good**	**good**	**fair**	**poor**	**very poor**
(d) scale / mode recognition?	**very good**	**good**	**fair**	**poor**	**very poor**
(e) singing in tune?	**very good**	**good**	**fair**	**poor**	**very poor**
(f) holding a vocal part?	**very good**	**good**	**fair**	**poor**	**very poor**

THANK YOU FOR YOUR PARTICIPATION IN THIS SURVEY.

Appendix I

Memorandum to Nominated Supervisors: Pre-test

USQ
AUSTRALIA

FACULTY OF ARTS
Phillip Gearing
Department of Music
PHONE (07) 4631 1108 / FAX (07) 4631 1133
EMAIL gearing@usq.edu.au

Memorandum

TO: Supervisors, Music Craft Pre-test

FROM: Examiner, Music Craft courses

DATE: 8 March 2002

RE: **PRE-TEST FOR AURAL MUSICIANSHIP**

Thank you for agreeing to supervise the enclosed test.

In this envelope you should have:

- One (1) Informed Consent Form
- One (1) Survey
- One (1) Aural Musicianship Test
- One (1) Audio CD
- One (1) Reply Paid Envelope

Please check the contents, and if any item is missing, please advise me immediately.

The test should be administered on (or as close as possible to) Wednesday 13 March. All students should complete the test, but as it will be used towards my PhD project, the student should firstly read the Informed Consent Form. If s/he is willing to participate in the project, s/he will sign and the date the form and complete the survey. You as the supervisor would sign and date the Informed Consent Form as the witness.

The student will then complete the test. The test is administered by you by playing the audio CD, without stopping. The student will write answers on the test paper.

The total time should be less than one hour (Informed Consent: 2 minutes; Survey: 5 minutes; Test: 40 minutes).

When all items are completed, please return ALL contents (used or unused) in the Reply Paid Envelope.

With thanks.

Phillip Gearing

Appendix J

Memorandum to External Students

USQ
AUSTRALIA

FACULTY OF ARTS
Phillip Gearing
Department of Music
PHONE (07) 4631 1108 / FAX (07) 4631 1133
EMAIL gearing@usq.edu.au

Memorandum

TO: External students enrolled in MUS1021/91507 Music Craft 1

FROM: Examiner, Music Craft courses

DATE: 5 March 2002

RE: **PRE-TEST FOR AURAL MUSICIANSHIP**

Dear

As a student enrolled externally in Music Craft 1, you will be required to complete a pre-test in aural musicianship. This pre-test will incidentally contribute towards a project I am running as part of my PhD studies.

You will be involved in completing the test on (or as close as possible to) 13 March 2002, and again in June 2002. Please note that the results are used only by the University of Southern Queensland to determine levels of aural awareness. Any results that may be used as part of the PhD project will not be reported as individual results – only group results will be used.

The test will comprise short questions relating to

- Rhythmic dictation
- Melodic dictation
- Scale/mode identification
- Interval identification

You will also be requested to complete a short questionnaire and to sign an Informed Consent.

To ensure the integrity of the testing procedure that is required for this project, I would be grateful if you would provide me with the name and address of a suitable person to act as your supervisor for the test. The audio CD and papers for the test will be sent to this supervisor, who would also be required to return all the materials to me after completion of the test.

Supervisor details can be sent to me preferably be email, fax, telephone or post as shown in the letterhead. Email and fax are the preferred (and quickest) options.

Thanking you in anticipation.

Yours sincerely

Phillip Gearing

Appendix K

Memorandum to Nominated Supervisors: Post-test

FACULTY OF ARTS
Phillip Gearing
Department of Music
PHONE (07) 4631 1108 / FAX (07) 4631 1133
EMAIL gearing@usq.edu.au

Memorandum

TO: Supervisors, Music Craft Post-test

FROM: Examiner, Music Craft courses

DATE: 6 June 2002

RE: **POST-TEST FOR AURAL MUSICIANSHIP**

Thank you for agreeing to supervise the enclosed test.

In this envelope you should have:

- One (1) Aural Musicianship Test
- One (1) Audio CD
- One (1) Reply Paid Envelope

Please check the contents, and if any item is missing, please advise me immediately.

The test should be administered on (or as close as possible to) Wednesday 19 June. The test is administered by you by playing the audio CD, without stopping. The student will write answers on the test paper.

The total time should be less than 45 minutes (the audio CD runs for 40 minutes).

When all items are completed, please return ALL contents (used or unused) in the Reply Paid Envelope.

With thanks.

Phillip Gearing

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